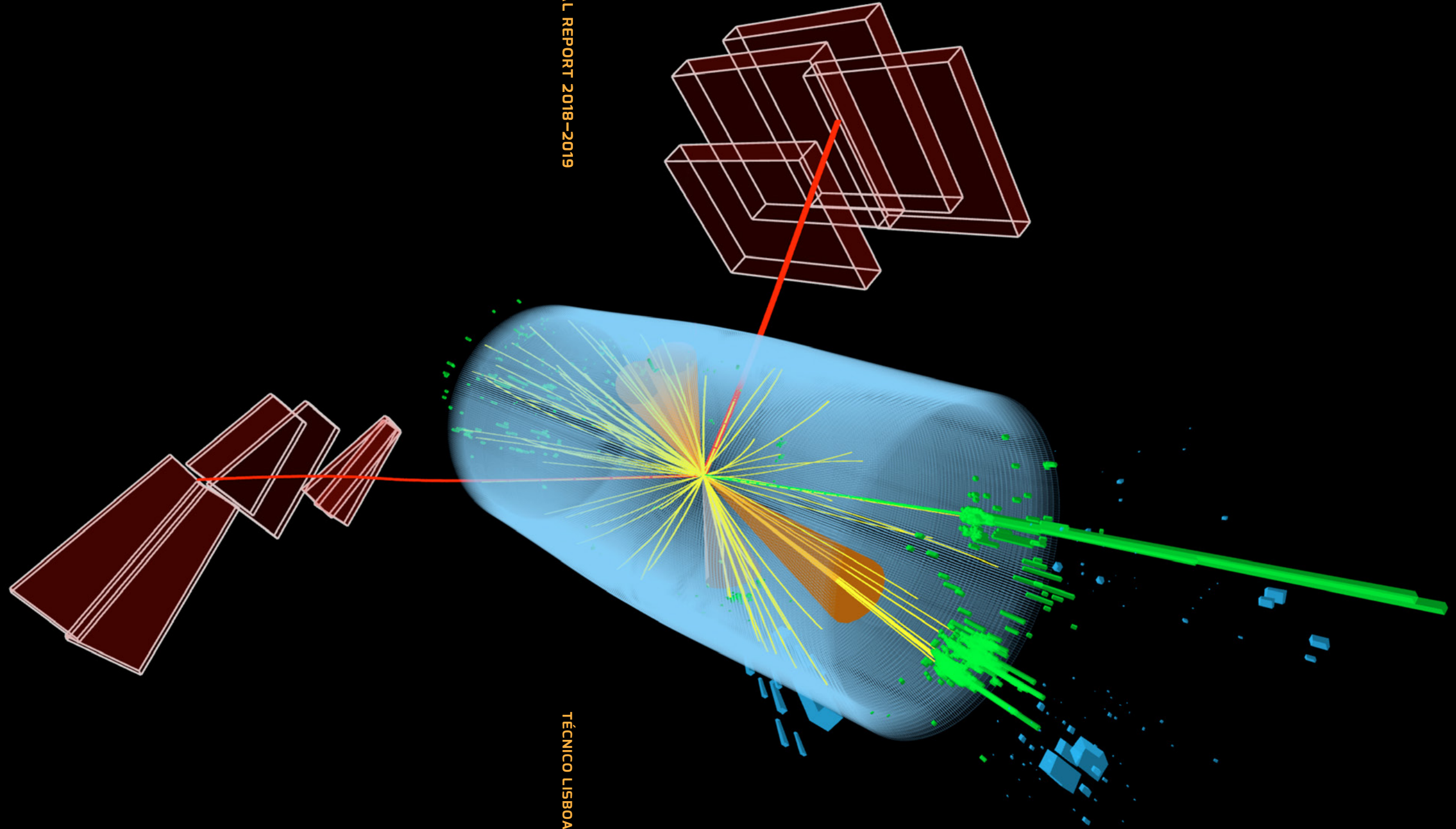


*Display of a candidate event in which a Higgs boson decays into two muons. CMS Experiment at the LHC, CERN.
Data recorded: 2018-Jul-18 22:42:55.530432 GMT.
Run/Event/LS: 319639/961085861/624.
Image: CERN (CMS Collaboration & T. McCauley)*

DEPARTMENT OF PHYSICS

BIENNIAL REPORT 2018–2019

DEPARTMENT OF PHYSICS • BIENNIAL REPORT 2018–2019



TÉCNICO LISBOA



TÉCNICO LISBOA

DEPARTMENT OF PHYSICS

BIENNIAL REPORT 2018–2019

TABLE OF CONTENTS

1

ACRONYMS › 5
INTRODUCTION › 6
MESSAGE FROM THE PRESIDENT › 7
THE PRESIDENTS OF THE PHYSICS DEPARTMENT › 10
DEPARTMENTAL ACTIVITIES › 12
ORGANIZATION OF THE DEPARTMENT OF PHYSICS › 14
THE DEPARTMENT IN NUMBERS › 16

2

EDUCATION › 18
ENGINEERING PHYSICS › 19
THE MEFT CURRICULUM › 21
DOCTORAL PROGRAM IN PHYSICS › 27
DOCTORAL PROGRAM IN ENGINEERING PHYSICS › 29
DOCTORAL THESES IN PHYSICS › 31
DOCTORAL THESES IN ENGINEERING PHYSICS › 33
MASTER THESES › 37
PEDAGOGICAL HONOURS AND AWARDS › 44

3

SCIENTIFIC AREAS › 48
ASTROPHYSICS AND GRAVITATION › 49
CONDENSED MATTER AND NANOTECHNOLOGY › 52
INTERDISCIPLINARY PHYSICS › 57
PARTICLE AND NUCLEAR PHYSICS › 59
PLASMAS, LASERS AND NUCLEAR FUSION › 63

4

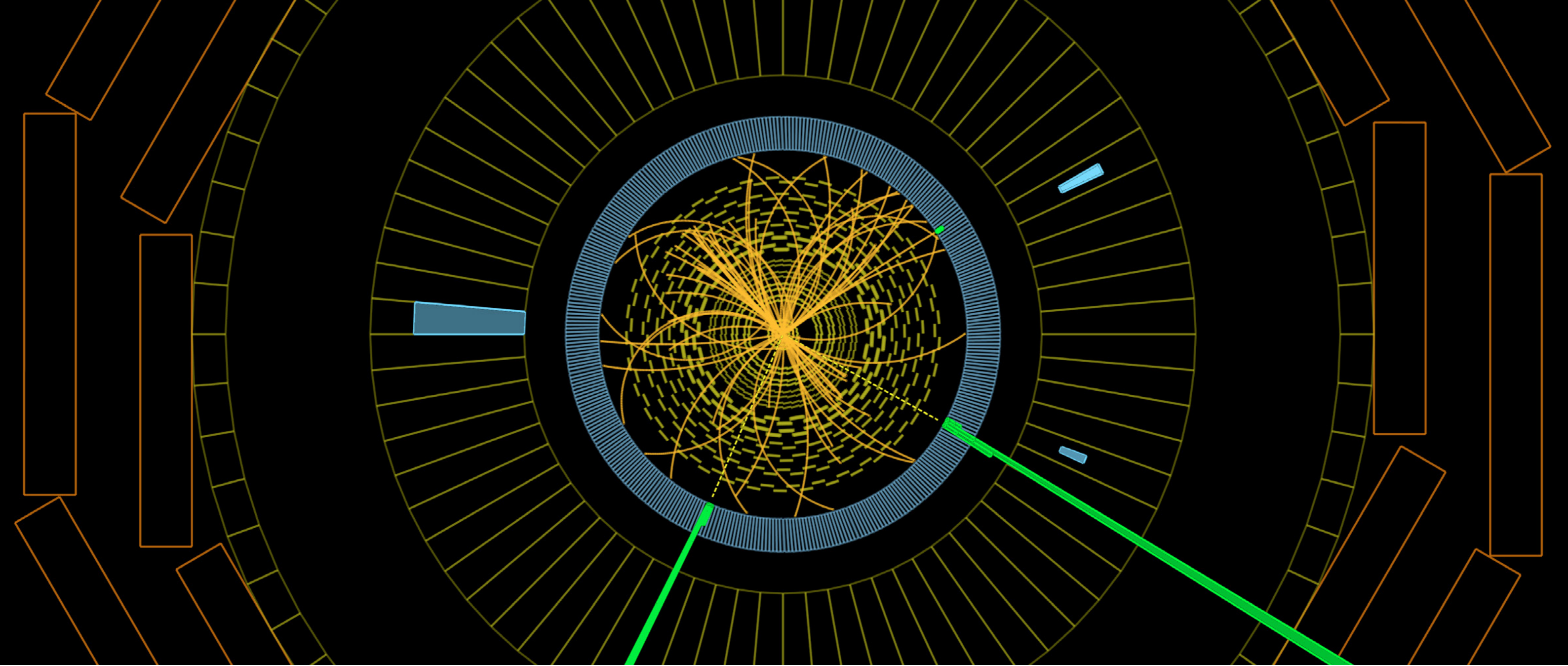
SCIENTIFIC ACTIVITIES › 66
NOBEL AND IST DISTINGUISHED LECTURES › 67
DF COLLOQUIA › 68
RESEARCH SEMINARS › 70
CONFERENCES AND WORKSHOPS › 81
SCHOOLS › 83
SCIENTIFIC PUBLICATIONS › 84
BOOKS › 116

5

SCIENCE AND SOCIETY › 118
SUPPORT TO NFIST ACTIVITIES › 120
PHYSICS OLYMPIADS › 121
IST DAY: KEEP IN TOUCH › 121
IPHO 2018/49TH INTERNATIONAL PHYSICS OLYMPIAD › 122
MEFT: CHALLENGING THE LIMITS OF SCIENCE AND TECHNOLOGY › 123
MEFT: EXTENDING THE LIMITS OF SCIENCE AND TECHNOLOGY › 123
NEWTONMAS › 124
VISITS FROM SCHOOLS › 125
OUTREACH SEMINARS AT SCHOOLS AND OTHER INSTITUTIONS › 126

6

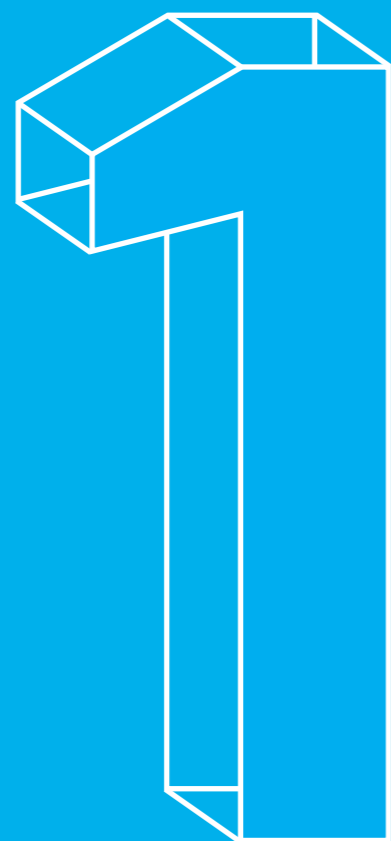
FACULTY AND STAFF › 128
ACKNOWLEDGEMENT TO COLLABORATORS › 129
LIST OF FACULTY AND STAFF › 130
FACULTY › 132
ADMINISTRATIVE STAFF › 203



*CMS event displays of Higgs to two photon candidate.
Image: CERN (CMS Collaboration & T. McCauley)*

ACRONYMS

AG	Scientific Area of Astrophysics and Gravitation
DF	The Physics Department
FI	Scientific Area of Interdisciplinary Physics
FMCN	Scientific Area of Condensed Matter and Nanotechnology
FPFN	Scientific Area of Particle and Nuclear Physics
FPLFN	Scientific Area of Plasmas, Laser and Nuclear Fusion
IST	Instituto Superior Técnico
KIT	Keep in Touch event celebrating IST's anniversary
MEFT	Integrated Master degree in Engineering Physics and Technology



INTRODUCTION

40 YEARS OF THE PHYSICS DEPARTMENT



*Prof. Teresa Peña, president of the DF.
Image by Técnico Lisboa.*

In 2020, the closing year for this biennial activity report, the Department of Physics (DF) celebrates its 40th Anniversary. In this same year, an unexpected pandemic has forced upon us new ways of working and teaching. Although unrelated the two facts can be linked.

The celebration of the 40th anniversary makes us realize the value of innovation that was at the origin of the Department of Physics. This celebration also allows us to emphasize values that have always united us as a Department. To thrive during the pandemic these values and the ability to innovate are decisive. Our origins, together with our 40 years of existence, prepared us well to adapt with

imagination to the uncertainty of the difficult conditions of the COVID-19 Coronavirus pandemic. We are managing to thrive in our teaching and in our role in society, in spite of adversity. Within the period of a single week, our “classrooms” mixed the digital and the traditional blackboards. In the months of lockdown numerical codes till then solely at the service of research and teaching were applied to sophisticated models, data analyses of the spread of the virus were constantly updated, etc.

It was the dispatch 722/80 of September 25th 1980, that created the Department of Physics. In its early days and according to that dispatch, the DF was organized in two sections: “Section of the

Mechanics and Quantum Physics” and “Section of Fluid Mechanics and Thermodynamics”.

From 1980 until today we experienced 4 decades of a notable growth, of leadership in scientific and educational programmes, which are demonstrative to the whole country of the incalculable value of scientific culture and advanced training in science and technology.

In 1986 the first edition of the 5 years degree of Engineering Physics and Technology (then LEFT, now MEFT), the first of its kind in Portugal, was launched. Already in 1984 the Department had started to train the first new breed of those Engineers, attracting to a course of 3 years students from other traditional engineering branches. IST was with all its generosity and rationality with the Physics Department on this strategy.

In 2016 this degree has attained the crystal roof of the maximal marks in the National Applications Contest, that for many years was only attained by courses in Medicine, and has been there ever since. The graduates in Engineering Physics, after their transit through the Department of Physics at Técnico, have found professional opportunities in research, science policy and government, software engineering, finance, banking and risk analysis, health consultancy, telecommunications and financing sectors...

Many have created start-ups, companies in bio-engineering technologies and renewable energies production, and many occupy places in academia. The Técnico Engineering Physics Diaspora is today vibrant in leadership positions spread through several continents.

At present the DF is also responsible for two doctoral programmes with a great dynamism and that involve about 100 graduated students. To strengthen even further this Graduate School is one of our important goals for the future.

THE ORIGINS

The concept behind the creation of the Physics Department followed the tradition at Técnico of an Engineering training supported by a matrix of solid knowledge in Physics and Mathematics. But it also followed the inspiration of the movements at the time, initiated in the sixties, within an Europe still profoundly divided by the Iron Curtain and the Berlin Wall. The spirit was that collaboration between scientists and engineers was required to answer to increasingly complex challenges.

It was the time of an unification through cultural, scientific and technological exchange, that started

dissolving borders. And the proof of concept was happening in the international science model cast at a large scale by CERN, the European Organization for Nuclear Research, created in the aftermath of the 2nd Great World War which had shattered the European scientific leadership.

During its 40 years of existence, the DF has actually grown following the international context and consolidated, without crystalizing it, the work of his founders: Manuel Alves Marques (the first doctorate at Técnico!), José Mariano Gago, Carlos Matos Ferreira and Jorge Dias de Deus.

THE VISION

By this order, these were the first four Presidents of the DF. These founders transferred to Técnico, with great courage, the vision of the research in large international research facilities and centres. All the four were engineers trained at Técnico, before becoming physicists. But even within Técnico itself, in those initial times of the DF, research was still treated by many as an unnecessary curiosity.

The training in Engineering Physics and Technology combines in a unique way Physics, Mathematics, Engineering and advanced Technologies. It realizes in the training domain the initial vision of José Mariano Gago, Carlos Matos Ferreira and Jorge Dias de Deus.

This vision is based on the recognition that economic, social and human progress can be achieved through the comprehension and modification of the world, made possible by advanced Physics. By explaining the macroscopic reality, Physics brought the scientific, technological and industrial revolutions of the XVIIth, XVIIIth and XIXth centuries. By going to the scales of the atomic nucleus, electrons, atoms and molecules, with the revolution of Quantum Mechanics, Physics made possible in the XXth century the digital revolution. In the XXIst century, Physics supports emerging technologies, such as nanotechnology, biotechnology, quantum computing, artificial intelligence. In these domains the physical, biological and digital systems are being blended and superimposed, changing our notion of what means being human and how science is made.

José Mariano Gago, Carlos Matos Ferreira and Jorge Dias de Deus guessed the value of a flexible training for the contexts of knowledge and professions in present days accelerated change. A broad and solid training for a world demanding human resources trained for a critical mind, creativity, rigor and agility of thought.

THE LEGACY AND THE FUTURE

In 40 years, the legacy of the Department of Physics to Técnico and to Portugal was that of a great expansion and, above all, a transformative one.

And certainly, it will continue to be so in the future. In 1980 there were only two sections in DF. Today the DF is organized in five scientific areas: Astrophysics and Gravitation; Condensed Matter Physics and Nanotechnology; Interdisciplinary Physics; Particle and Nuclear Physics; Plasma Physics, Lasers and Nuclear Fusion.

In the future the DF will include other scientific areas, will certainly participate in different education programmes, and will establish new international collaborations.

We are well prepared for research in the wavefront, exploring the limits of particle accelerators and detectors, space travel, gravitational waves, the origins and elements of the cosmos, and new functional materials. Members of the department are also applying powerful machine learning algorithms that are changing not only the way physicists work, but also the daily lives of everybody.

In addition to its students of all training cycles and levels, today the DF is an enlarged family, with 48 professors, a real ecosystem encompassing collaborators and researchers of its associated research units, connected also by 10 administrative non-teaching employees. The latter ones maintain the daily logistics crucial to our activity. We thank them for that.

All of us, professors, researchers, administrative employees, have a common goal: to work for supporting and raising the talent of new generations. We have been able to attract remarkable students, that everyday push us to the challenge of constant re-creation.

Moreover, 2018 announced the end of integrated master's degrees, by the Decree Law 65/2018 of the Ministry of Science, Technology and Higher Educa-

tion. The new legislation was done upon consultation of the OCDE, and has a particular impact on the training of engineering. The integrated master's concept was a unique feature of the implementation by Portuguese Universities of the Bologna process of 2006. It had survived in its originality till now, but the new Law led us, during 2019, to design and prepare the re-structuring of MEFT, namely for a better adaptation to the international landscape.

Because of our students and also the new external constraints, we are inventing new forms of research and problem-based training, multidisciplinary integrating projects, ways of bridging academia and businesses. We are valuing cross-cutting skills and a humanist component in the syllabus, as well as new evaluation procedures, the key aspect being the introduction of even more flexibility in the training of MEFT.

And, as a Department open to other Departments at Técnico, we participated in the design of interdisciplinary Minors to be included in several engineering specializations. Furthermore, in 2019 the Department of Physics had also to re-think and negotiate with other departments at Técnico changes in the syllabuses of General Physics courses. We will continue to emphasize the value of experimental classes and, due to the pandemic constraints, we are actually probing new methods of collaboration in laboratory and hands-on classrooms where students in person interact remotely with other students, and motivate students to team-oriented work.

We are sure that the DF will not stop its evolution. It will keep being lively, vigorous, inclusive, and dedicated to a future better for all.

I was the first female President of the Physics Department and shall not be the last.

Teresa Peña

President of the DF in the period 2019–2020
IST, December 16th, 2020

THE PRESIDENTS OF THE PHYSICS DEPARTMENT

Since its start the Physics Department had 14 Presidents, some with more than one mandate. The success of DF is also due to the work of these Presidents and of the Executive Committees chaired by them, to whom the DF thanks their commitment.



Jorge Romão
Particle Physicist
2001–2002



Carlos Varandas
Plasma and Nuclear Fusion Physicist
2003–2006



Paulo Freitas
Solid State and Nano-
technology Physicist
2007–2008



Manuel Alves Marques
Condensed Matter Physicist
1981–1982



José Mariano Gago
Particle Physicist
1982–1983



Carlos Matos Ferreira
Plasma Physicist
1984–1986 & 1992–1994



José Tito Mendonça
Plasma and Lasers Physicist
2009–2010



José Sande Lemos
Physicist and Astrophysicist
2013–2014



Pedro Brogueira
Solid State and Nano-
technology Physicist
2015–2016



Jorge Dias de Deus
Particle Physicist
1987–1989 & 1995–1998



Alfredo Barbosa Henriques
Physicist and Astrophysicist
1990–1991 & 2011–2012



Gustavo Castelo Branco
Particle Physicist
1999–2000



Luís Lemos Alves
Plasma Physicist
2017–2018



Teresa Peña
Nuclear Physicist
2019–2020

DEPARTMENTAL ACTIVITIES

In the biennial of 2018–2019, the Department of Physics (DF) carried out various actions covering its different fields of activity.

STRATEGIC ACTIONS

- Concluded the reports about the teaching offer for the courses of IST.
- Analysed the implementation/execution of the support laboratories for basic physics, as offers to the courses of IST.
- Analysed the experimental teaching of the Master's in Engineering Physics (MEFT), and requalified the corresponding experimental infrastructures (in terms of equipment and facilities).
- In the scope of PERCIST 2021/2022, restructured the offer of the Physics Department to all courses of IST, in blocks of 7+1 weeks (trimesters) of concentrated classes.
- Restructured MEFT entirely to split in 1st and 2nd cycles of studies, as separate degrees and as required by governmental decision, also following the proposals stemming from PERCIST 2021/2022.

HUMAN RESOURCES

- Continued the implementation of the DF Strategic and Development plan and the career plan of IST, by recruiting/promoting the following positions: 2 associated professors, one in *double appointment* with the Department of Nuclear Science and Engineering (Guilherme Milhano and Patrícia Gonçalves) and 3 assistant professors (Pedro Ribeiro, Patrícia Conde-Muiño, Jorge Vieira).
- Developed actions for monitoring the activity of assistant professors during the probationary period.

TEACHING

- Supports the coordination of several courses:
 - Integrated Master's degree in Engineering Physics (MEFT)
 - Doctoral Program in Physics (DF)
 - Doctoral Program in Engineering Physics (DEFT)
- Coordinates 26 curricular units in Fundamental Physics at IST (Mechanics and Waves – MO, Electromagnetism and Optics – EO, Thermodynamics and the Structure of Matter – TEM, Physics for the Integrated Master's degree in Architecture), taught to more than 2000 students of various Engineering degrees every year in Alameda and Taguspark IST Campi.
- Concluded an analysis of the teaching activities (programs, evaluation, methodologies, bibliography, ...) in the curricular units of Fundamental Physics at IST, that involved brainstorm meetings with the coordinators of the different courses of IST that was highly appreciated.
- Continued the development of an on-line database for Problems of Fundamental Physics (e-ProF).
- Participated in the Scientific Committee of the Master's degree in Energy Engineering and Management (MEGE).
- Participated in the Scientific Committee of the Master's degree in Biomedical Engineering (ME-Biom).
- Participated in the IST Committee for the restructuration of the Bolonha model (PERCIST).
- Organized the teaching duties of the 80 members of DF, for the 1st, 2nd and 3rd cycle courses under the responsibility of the department.

MANAGEMENT

- Improved the communication and the administrative workflow at DF.
- Prepared, approved and executed the budget of the DF.
- Maintained the informatic tools for management support.

INFRASTRUCTURES

- Invested in the reequipment of the DF Laboratories at Alameda, namely for the experimental curricular units of MEFT.
- Invested in the reequipment of the DF Laboratories at Taguspark.
- Maintained the Multimedia Room of DF, for production of videos and MOOC's.

INTERNATIONAL RELATIONS

- Signed new ERASMUS protocols, aiming attracting more Portuguese and international students for MEFT and the PhD programs.
- Fostered new collaborations and protocols with various Institutions, national and international, for technological and scientific cooperation and for the exchange of students. Detailed information is given in the sites of the Scientific Areas.

CONNECTION TO SOCIETY

The interest of students choosing MEFT – Physics at IST – for their higher education has greatly increased in the last years, having attended in 2018 the top of the choices of students (and second in 2019), even after increasing the number of places by 15% in 2019. To this success there are many contributors, members of the DF but also from other universities and institutions, with an important contribution from the MEFT students and from the teachers at secondary schools.

In 2018, the DF collaborated with the Portuguese Physics Society and many other partners to host in Lisboa the 49th International Physics

Olympiad – IPhO2018. DF secured all the meetings of the IPhO2018 International Board at the Salão Nobre of IST and assured the managing of all the exams. DF was the support hub of the academic part of IPhO2018, guaranteeing the conditions for its good functioning, in particular also the preparation of the exams, the scanning of the students' tests, the correction procedure, the moderation process and the preparation of all the diplomas/certificates to be delivered to the students. Many members of the DF were key to the success of this important part of the Olympiad.

In 2019, the DF collaborated again with the Portuguese Physics Society and the Ministry of Education, among many other partners, to host in Almada the 17th European Union Science Olympiad – EUSO2019. In particular DF took part in the local organizing committee, assuming the responsibility of the preparation of the exams, scanning of the students' tests, and preparing all the diplomas/certificates to be delivered to the students.

In 2018 and 2019 the DF pursued and created various communicational initiatives, in a permanent effort for increasing the status and the visibility of DF and its training actions, inside and outside IST, in a collaboration effort involving the Executive Committee, the Coordination of MEFT, the DF staff, the students of MEFT (also through the corresponding students' association—the Núcleo de Física do IST, NFIST), and the alumni network of MEFT, namely:

- Colloquia of the Physics Department;
- IST Day;
- MEFT: Challenging the Limits of Science and Technology;
- MEFT: Enlarging the Limits of Science and Technology;
- Newtonmas (including an IST Distinguished Lecture);
- Facebook Physics@Tecnico;
- DF Biennial report 2016–2017.

ORGANIZATION OF THE DEPARTMENT OF PHYSICS

PRESIDENT OF THE DEPARTMENT

Teresa Peña

EXECUTIVE COMMITTEE

Teresa Peña, *President, Human Resources and Horizontal Teaching*

Horácio Fernandes, *Vice-President for Connection to Enterprises, Research Platforms and Alumni*

João Pedro Bizarro, *Vice-President for Teaching Activities*

António Ferraz, *Vice-President for General Affairs, Spaces and Budget*

Pedro Abreu, *Vice-President for Connection to Society*

REPRESENTATIVE OF THE DEPARTMENT OF PHYSICS IN TAGUSPARK

António Ferraz

COORDINATORS OF SCIENTIFIC AREAS

Vítor Cardoso, *Astrophysics and Gravitation (AG)*

Pedro Brogueira, *Condensed Matter and Nanotechnology (FMCN)*

Rui Dilão, *Interdisciplinary Physics (FI)*

Mário Pimenta, *Particle and Nuclear Physics (FPFN)*

Luís Lemos Alves, *Plasma Physics, Lasers and Nuclear Fusion (FPLEN)*

COURSE COORDINATORS

Master's in Physics Engineering (MEFT):

Ilídio Lopes, *Coordinator*

Carlos Cruz, *Vice-Coordinator*

Doctoral Program in Physics (DF):

Luís Lemos Alves, *Coordinator*

Doctoral Programme in Engineering

Physics (DEFT):

Luís Lemos Alves, *Coordinator*

RESPONSIBLE FOR THE TUTORING PROGRAM

Ilídio Lopes

MOBILITY COORDINATOR

Ilídio Lopes

MEFT SCIENTIFIC COMMITTEE

José Sande e Lemos, *AG*

Ilídio Lopes, *AG*

Horácio Fernandes, *FPLEN*

João Pedro Bizarro, *FPLEN*

Jorge Romão, *FPFN*

Mário Pimenta, *FPFN*

Pedro Brogueira, *FMCN*

Carlos Cruz, *FMCN*

DF SCIENTIFIC COMMITTEE

José Sande e Lemos, *AG*

Vítor Cardoso, *AG*

José Luís Martins, *FMCN*

Vítor Rocha Vieira, *FMCN*

Jorge Romão, *FPFN*

Luís Oliveira e Silva, *FPLEN*

Luís Lemos Alves, *FPLEN*

DEFT SCIENTIFIC COMMITTEE

José Sande e Lemos, *AG*

Vítor Cardoso, *AG*

Pedro Brogueira, *FMCN*

Vítor Rocha Vieira, *FMCN*

Mário Pimenta, *FPFN*

Luís Lemos Alves, *FPLEN*

PERMANENT STRATEGIC COMMITTEE

José Sande e Lemos, *Full Professor, AG*

Luís Lemos Alves, *Full Professor, FPLEN*

Pedro Brogueira, *Full Professor, FMCN*

Teresa Peña, *Full Professor, FPFN*



Students observe an experiment during NFIST's *Semana da Física*, 2018.

Mário Pimenta, *Full Professor, FPFN*

Ana Mourão, *Associate Professor, AG*

Pedro Sebastião, *Associate Professor, FMCN*

Horácio Fernandes, *Associate Professor, FPLEN*

Rui Dilão, *Assistant Professor, FI*

REPRESENTATIVE OF DF IN MEGE

Filipe Mendes

REPRESENTATIVE OF DF IN MEBIOM

Patrícia Gonçalves

SCIENTIFIC AND PEDAGOGIC COUNCIL

Teresa Peña, *President DF*

Horácio Fernandes, *Vice-president DF*

João Pedro Bizarro, *Vice-president DF*

António Ferraz, *Vice-president DF and*

Representative DF in Taguspark

Pedro Abreu, *Vice-president DF*

Vítor Cardoso, *Coordinator AG*

Pedro Brogueira, *Coordinator FMCN*

Mário Pimenta, *Coordinator FPFN*

Luís Lemos Alves, *Coordinator FPLEN,*

Coordinator DF and DEFT

Rui Dilão, *Coordinator FI*

Ilídio Lopes, *Coordinator MEFT*

Carlos Cruz, *Vice-Coordinator MEFT*

João Santos, *Coordinator MEBiom*

Edgar Fernandes, *Coordinator MEGE*

Pedro Vaz, *representative C2TN*

João Seixas, *representative CeFEMA*

José Sande e Lemos, *representative CENTRA*

Margarida Nesbitt, *representative CFTP*

Maria João Pereira, *representative CERENA*

Margarida Nesbitt, *representative CFTP*

Susana Freitas, *representative LNESEC-MN*

Bruno Gonçalves, *representative IPFN*

Fernando Barão, *representative LIP*

RESPONSIBLE FOR THE E-LEARNING PLATFORM OF DF

Samuel Eleutério

RESPONSIBLE FOR EQUIVALENCE PROCESSES IN DF

Pedro Bicudo

RESPONSIBLE FOR TEACHING LABORATORIES OF DF IN CAMPUS ALAMEDA

João Mendanha Dias

RESPONSIBLE FOR TEACHING LABORATORIES OF DF IN CAMPUS TAGUSPARK

João Carlos Fernandes

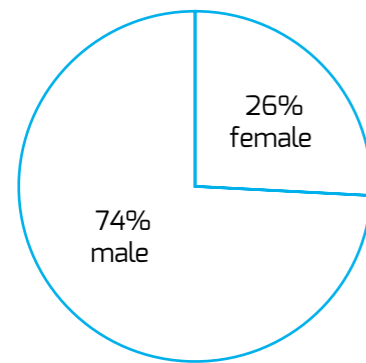
RESPONSIBLE FOR DEMO LABORATORY OF DF

Ana Mourão

THE DEPARTMENT IN NUMBERS*

403

Students enrolled
in MEFT



5

Scientific areas
of expertise

8

Leading
research units

48

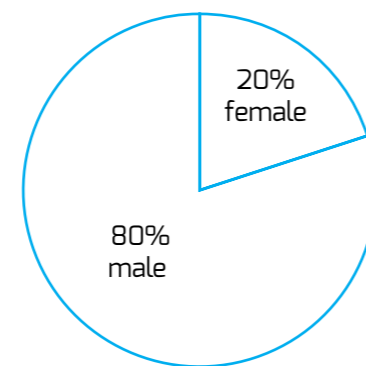
Permanent
faculty

10

Administrative
& technical staff

88

Students enrolled in the
doctorate programmes



578

Scientific
publications

2

Books

34

Honours/awards for
pedagogical achievements

14

Teaching
laboratories

2

High performance
computing clusters

2

IST distinguished
lectures

29

Colloquia
at the DF

180

Research
seminars

19

Conferences
and workshops

7

Undergraduate
and graduate schools

168

Outreach
activities

4

International masterclasses
in Particle Physics

*As of December 31, 2019.



EDUCATION

ENGINEERING PHYSICS



The 2019 incoming class of MEFT students.

WHAT IS MEFT?

The Integrated Master of Engineering Physics (in Portuguese the acronym MEFT stands for “Mestrado de Engenharia Física Tecnológica”) is a five-year degree that delivers comprehensive training and explores the fields of Physics, Engineering and Advanced Technologies, aiming to prepare the next generation of highly qualified scientists or engineers in Physics.

During a five-year period, the students follow an academic curriculum providing high-quality, diversified education focused on digital fluency and skills in STEM (Science, Technology, Engineering and Mathematics) subjects, encouraging continuous learning and supporting the development of creativity and innovation.

WHAT ATTRACTS TOP TALENT TO MEFT?

In 2018 and 2019, respectively sixty and sixty nine students from all across Portugal with entry marks above 187.5/200, have chosen MEFT to pursue their studies. MEFT was the top course at national level in ex-æquo with one other course. In the last fifteen years, MEFT was consistently the first choice for students eager to follow a career path in physics or engineering physics, among the thirteen similar courses available in the country.

In addition to MEFT’s high educational standards, the combination of many factors such as: enabling close interaction with the Physics department and high-quality research centres, allowing access to international research collaborations and partnerships with international businesses and corporations, pro-



The 2018 incoming class of MEFT students.

THE MEFT CURRICULUM

MEFT is sustained by scientific research units carrying out their investigation in the following areas:

- Astrophysics and Gravitation;
- Plasma Physics, Nuclear Fusion and Lasers;
- Nuclear and Particle Physics;
- Condensed Matter Physics and Nanotechnology;
- Interdisciplinary Physics (Energy, Physics of the Earth, Dynamical Systems, Biomedical Applications).

A new MEFT curriculum was introduced in September 2017, to make it simultaneously more flexible and organised, which is already reflected in the following tables. The 1st Cycle features a strong training in Mathematics and in the Physics fundamentals, with a few options, and the 2nd Cycle, in which the student follows more a Physics Track or a Engineering Track based on his/her profile and choices, features many options for the student to define his/her plan of studies best suited to his/her wishes and interests.

motivating and encouraging a wide range of scientific and cultural student-driven initiatives and events; all these make MEFT particularly appealing to attract the best young talent from Portugal and abroad.

WHAT MEFT BRINGS TO ITS STUDENTS

The course delivered within a fostering, motivating and positive environment, prepares graduates to develop their own creative and original approach to solve problems and think “out of the box”, whilst acquiring a robust scientific and engineering background. MEFT’s students are particularly sought-after by top employers.

About one fifth of the graduates chooses to continue for a doctorate; the others opt to go directly to a wide variety of areas in the private sector, such as: energy, environment, health systems and biomedicine, financial services and consulting. Among the students who decide to do a PhD, after the PhD, a part follows a research career in international universities or research institutes, or go to the private sector, particularly in companies related to new technologies.

All of our graduates easily and quickly find employment soon after finishing their master’s or doctorate. The employment rate six months after the completion of MEFT is officially reported as almost 100.0%. About 20% of the MEFT graduates opt to follow an international career. Presently there are graduates of MEFT working in the leading national and international companies and some have created their own start-ups.

MEFT PREPARES ITS GRADUATES TO THRIVE IN TODAY’S CHALLENGING WORLD

The challenges facing physics engineers have changed significantly over the years. Constantly evolving, MEFT prepares our graduates to become leaders in today’s world so they are able to develop, implement and operate complex value-added engineering systems in a modern team-based environment. In particular, the MEFT course contributes to:

- create the next generations of researchers and university lecturers in areas of scientific research of physics, engineering and related fields.
- graduate engineers with the capacity to present innovative solutions, constructively intervene to solve complex problems in various sectors, namely, energy, environment, health and biomedicine, organization and visualization of information, computing and simulation, industrial production and finance.
- trigger the development of entrepreneurial leaders and company creators, with great adaptability to the technology and scientific development of today’s world, and to prepare insightful consultants/auditors to assess complex projects.

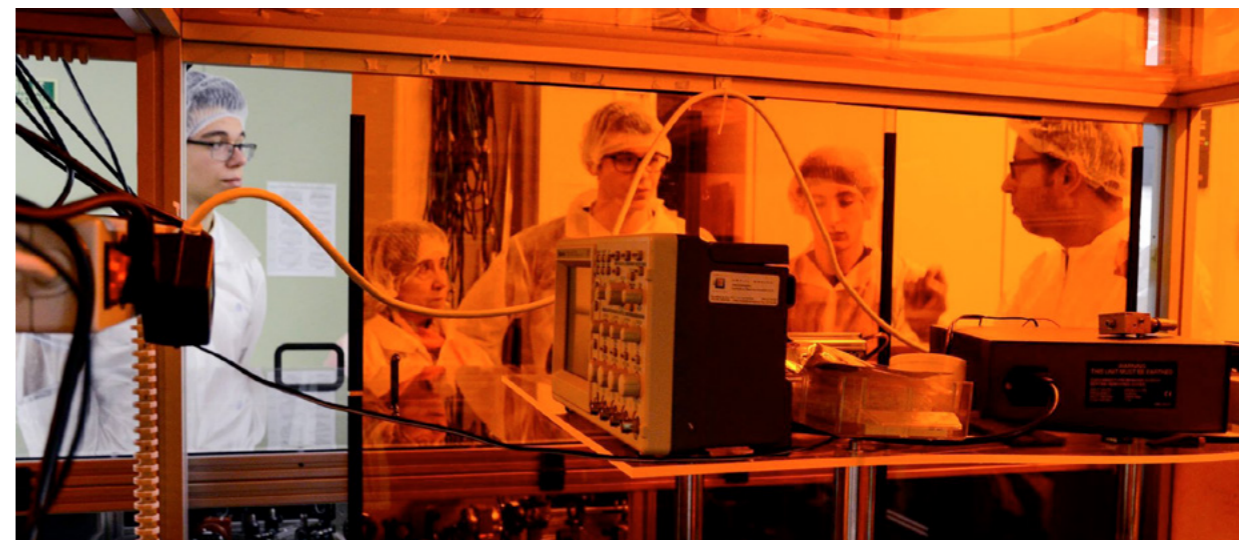
*Ilídio Lopes and Carlos Cruz,
MEFT Coordination, November 2020*

The 2018 senior class of MEFT students.



MEFT Training: 1st Cycle		
	1st semester	2nd semester
1st year	Mechanics and Relativity Intro Experimental Physics Laboratory Programming Linear Algebra Differential & Integral Calculus I	Oscillations and Waves Chemistry Differential & Integral Calculus II Digital Systems Technological Laboratory
2nd year	Physical Thermodynamics Laboratory of Mechanics, Oscillations and Waves Complex Analysis and Differential Equations Computational Mathematics Computational Physics	Analytical Mechanics Electromagnetism Circuits Theory and Electronic Fundamentals Laboratory of Electromagnetism and Thermodynamics Probabilities and Statistics
3rd year	Classical Electrodynamics Quantum Mechanics I Laboratory of Atomic Physics Physics of Continuous Media Option 1: Techniques of Mathematical Physics / Electronics	Statistical Physics Solid State Physics Laboratory of Advanced Physics Management Laboratory for Innovation and Development Option 2: Quantum Mechanics II / Microcontrollers

MEFT Training: 2nd Cycle		
	1st semester	2nd semester
4th & 5th years	4 Curricular Units from structural training 1[2] Curricular Unit(s) – Engineering track or 1[2] Curricular Unit(s) – Physics track	 3[2] Curricular Units – Engineering track or 3[2] Curricular Units – Physics track
	5 Curricular Units from the pool common to both tracks	
5th year	Introduction to Research Project–MEFT	Dissertation



CURRICULAR UNITS IN STRUCTURAL TRAINING

Astrophysics
 Entrepreneurship and Innovation and Science Management
 Nanotechnologies and Nanoelectronics
 Particle Physics
 Plasma Physics and Technology



CURRICULAR UNITS IN PHYSICS TRACK

1st semester:

Complements of Quantum Mechanics
 Optics and Laser

2nd semester:

Condensed Matter Physics
 Nuclear Physics
 Relativity and Cosmology

CURRICULAR UNITS IN ENGINEERING TRACK

1st semester:

Electronic and Optics Instrumentation
 Optics and Laser

2nd semester:

Energy Technologies
 Micro and Nanofabrication Techniques
 Nuclear and Particle Physics Technology

CURRICULAR UNITS COMMON TO BOTH TRACKS

1st semester:

Advanced Topics in Computational Physics
 Astrophysics Laboratory
 Complements of Condensed Matter Physics
 Complements of Electronics
 Condensed Matter Physics Laboratory
 Diagnostic Techniques in Plasmas
 Dynamical Systems
 Group Theory in Physics
 Hadron Physics and Quantum Chromodynamics
 Low Temperature Plasmas
 Materials Science for Nuclear Technologies
 NMR of Partially Ordered Systems
 Nuclear Fusion, Photovoltaic Solar Energy
 Physics and Technology of Magnetic Materials
 Physics of Nuclear Reactors
 Radiological Protection and Dosimetry
 Topics in Condensed Matter Physics
 Topics in General Relativity and Cosmology
 Topics in Particle Physics, Astrophysics and Cosmology

2nd semester:

Advanced Plasma Physics
 Biophysics
 Characterization Methods in Solid State Physics
 Cosmic Rays Laboratory
 Data Acquisition Systems
 Digital Logic Design and Control
 Energy Services
 Energy Technologies
 Experimental Methods in Particle Physics
 Introduction to Spintronics
 Physics and Technology of Semiconductors
 Physics of Liquid Crystals
 Plasma Technology for Materials Processing
 Quantum Field Theory
 Real-Time Control
 Simulation Methods for Particle Detectors
 Standard Model and New Physics

Both semesters: 5 free optional curricular units (from this or other courses of IST or from other Universities with a protocol with IST)

COORDINATION

Prof. Ilídio Lopes and Carlos Cruz

WEBSITE

<https://fenix.tecnico.ulisboa.pt/cursos/meft>

CURRICULAR UNITS OF FUNDAMENTAL PHYSICS FOR OTHER IST COURSES

The DF has the outstanding responsibility of teaching the general courses of Fundamental Physics to the 1st cycle of all Engineering courses of IST. In

total, this mission corresponds to a teaching workload in 26 Curricular Units (CU) of Mechanics and Waves (MO), Electromagnetism and Optics (EO), Thermodynamics and the Structure of Matter (TEM) and Physics, distributed among 18 courses as indicated in the table below.

Curricular unit				
	Mechanics and Waves	Electromagnetism and Optics	Thermodynamics and the Structure of Matter	Physics
MEEC	▪	▪	▪	
MEAero	▪	▪		
MEBiom	▪	▪	▪	
LMAC	▪	▪	▪	
MEC		▪	▪	
LEGM	▪	▪	▪	
MEQ	▪	▪		
MEAmbi	▪	▪		
MEBiol	▪	▪		
MEM	▪	▪		
MEMec	▪	▪		
LEAN/LENO	▪	▪		
LEIC – Alameda	▪	▪		
LEIC – Tagus Park	▪	▪		
LETI – Tagus Park	▪	▪		
LEE – Tagus Park	▪	▪	▪	
LEGI – Tagus Park	▪	▪		
MA				▪

CURRICULAR UNITS OF ADVANCED PHYSICS FOR IST COURSES OTHER THAN MEFT

The DF has also the responsibility of teaching the following curricular units to the Biomedical En-

gineering degree (MEBiom) and to the Master in Energy Engineering and Management (MEGE), in the latter case divided by specialization field. In the scientific committee of both degrees the DF has a permanent member.

Curricular unit			
Courses		Quantum Mechanics	Radiation Physics
	MEBiom	▪	▪

Specialization field						
MEGE courses		Nuclear Energy	Renewable Energies	Energy Conversion	Fuels	Energy Efficiency
	Energy Services		▪	▪	▪	▪
	Photovoltaic Solar Energy		▪			
	Solar Thermal Energy		▪	▪		
	Nuclear Reactors	▪		▪		
	Nuclear Energy			▪		
	Radiological Safety and Protection	▪				
	Radiation Physics and Technology	▪				
	Nuclear Fission and Fusion Technologies	▪				
	Nuclear Instrumentation Techniques	▪				
	Material Science for Nuclear Technologies	▪				
	Nuclear Physics	▪				
Quantum Structure of Matter	▪					

DOCTORAL PROGRAM IN PHYSICS

COORDINATOR

Luís Paulo da Mota Capitão Lemos Alves

SCIENTIFIC COMMITTEE

José Pizarro de Sande e Lemos
 Vítor Manuel dos Santos Cardoso
 José Luís Rodrigues Júlio Martins
 Vítor João Rocha Vieira
 Jorge Manuel Rodrigues Crispim Romão
 Luís Miguel de Oliveira e Silva
 Luís Paulo da Mota Capitão Lemos Alves

OBJECTIVES

The Doctoral Program in Physics is designed to provide advanced knowledge and research capabilities into subjects consistent with expertise available in the scientific areas of the Physics Department mainly in:

- Astrophysics and Gravitation;
- Plasmas Physics, Nuclear Fusion, Photonics and Intense Lasers;
- Physics of Condensed Matter, Nanotechnology, Solid State Physics and Atomic and Molecular Physics;
- Particle and High-Energy Physics, and Nuclear Physics.

After completing their PhD, the graduates of this program are expected to have acquired the ability to perform autonomous scientific work in their particular field of study, expanding the frontiers of knowledge with their original research to the highest standards of quality and integrity. These graduates should promote academic, professional, technological, social and cultural progress, in interaction with the academic community and the society at large.

THE PHD PROCESS

Obtaining the PhD degree in Physics from IST/ULisboa involves three main steps:

1. Complete a training component with several courses, as to complete 30–33 ECTS.
2. Present the state of development of the doctoral work before a Thesis Monitoring Committee (CAT), after the end of the second year of the doctoral program.
3. Write a PhD Thesis manuscript, which should describe original and independent research work at the level required for publication in international reference journals.

The doctorate will be completed after approximately 4 years, with the defense of the Thesis in public presentation and oral discussion.

ASSOCIATED RESEARCH UNITS

Centre for Astrophysics and Gravitation (CENTRA).

Centre of Physics and Engineering of Advanced Materials (CeFEMA).

Centre for Theoretical Particle Physics (CFTP).

Centre for Nuclear Sciences and Technologies (C2TN).

INESC Microsystems and Nanotechnologies (INESC-MN).

Instituto de Plasmas e Fusão Nuclear (IPFN).

Laboratory of Instrumentation and Experimental Particle Physics (LIP).

FUNDING OPPORTUNITIES

The Doctoral Program in Physics provides the following funding opportunities:

1. Doctoral Programs with their own scholarships, sponsored by the Foundation for Science and Technology (FCT), the national scientific funding agency: Advance Programme in Plasma Science and Engineering (APPLAuSE); Doctoral Programme in the Physics and Mathematics of Information (DP-PMI); International Doctorate Network in Particle Physics, Astrophysics and Cosmology (IDPASC); Advanced Integrated Microsystems (AIM).
2. Individual FCT fellowships.
3. Fundação Oriente Doctoral Scholarships for Asian students.
4. Scholarships in projects, within the research units associated with the Physics Department.

EMPLOYMENT

The graduates in Physics can integrate research units and R&D laboratories, namely with enterprises, in Portugal or abroad, in the public or the private sectors. These graduates are highly qualified researchers to work in large institutions of research and technological development: European Organization for Nuclear Research (CERN); European Southern Observatory (ESO); European Space Agency (ESA); Joint European Torus (JET); International Thermonuclear Experimental Reactor (ITER).

The PhDs in Physics can also follow an academic career as Professors of higher education, in national or international universities.

STATUS

In the period 2018–2019, 18 of our graduate students successfully concluded the Doctoral Program in Physics (8 with the maximum classification of “Approved with Distinction and Honour”).

In this period we have organized an annual meeting with all the students (to welcome the newcomers and present the program, clarifying the steps and rules of the PhD process) and we have appointed “PhD delegates” to represent the students in the hosting research units. As usual, our participation in IST’s annual event PhD Open Days was a great success. In 2019 we contributed to 21% of the posters presented (59% of our PhD students presented a poster at this event), 12% of the competition pitches, 13% of the workshops, and 25% of the prototype exhibitions.

Currently (September 2020), there are 56 students enrolled in the Doctoral Program in Physics, corresponding to a 33% increase with respect to 2019 (42 students enrolled, and 8 PhD theses concluded).

More information about the Doctoral Program in Physics is available at our recently updated website: <https://fenix.tecnico.ulisboa.pt/cursos/df>

DOCTORAL PROGRAM IN ENGINEERING PHYSICS

COORDINATOR

Luís Paulo da Mota Capitão Lemos Alves

SCIENTIFIC COMMITTEE

José Pizarro de Sande e Lemos
 Vítor Manuel dos Santos Cardoso
 Pedro Miguel Félix Brogueira
 Vítor João Rocha Vieira
 Mário João Martins Pimenta
 Luís Paulo da Mota Capitão Lemos Alves

OBJECTIVES

The Doctoral Program in Engineering Physics is designed to provide advanced knowledge and research capabilities into subjects involving applications in physical and engineering physics, consistent with the expertise available in the scientific areas of the Physics Department of IST, mainly in:

- Astrophysics and Gravitation
- Plasmas Physics, Nuclear Fusion, Photonics and Intense Lasers
- Physics of Condensed Matter, Nanotechnology and Solid State Physics
- Particle Physics and Nuclear Physics

The students are exposed to advanced experimental techniques in plasma physics, intense lasers, optics, nanotechnologies and nuclear and particle physics, including data acquisition systems, real time control measurements, instrumentation, and micro and nano-fabrication techniques.

After completing their PhD, the graduates of this program are expected to have acquired the ability to perform autonomous scientific work in their particular field of study, expanding the frontiers of knowledge with their original research to the highest standards of quality and integrity. These graduates should promote academic, professional, technological, social and cultural progress, in interaction with the academic community and the society at large.

THE PHD PROCESS

Obtaining the PhD degree in Engineering Physics from IST/ULisboa involves three main steps:

1. Complete a training component with several courses, as to complete 30–33 ECTS;
2. Present the state of development of the doctoral work before a Thesis Monitoring Committee (CAT), after the end of the second year of the doctoral program;
3. Write a PhD Thesis manuscript, which should describe original and independent research work at the level required for publication in international reference journals. The doctorate will be completed after approximately 4 years, with the defense of the Thesis in public presentation and oral discussion.

ASSOCIATED RESEARCH UNITS

Centre for Astrophysics and Gravitation (CENTRA)
 Centre of Physics and Engineering of Advanced Materials (CeFEMA)

Centre for Theoretical Particle Physics (CFTP)

Centre for Nuclear Sciences and Technologies (C2TN)

INESC Microsystems and Nanotechnologies (INESC-MN)

Instituto de Plasmas e Fusão Nuclear (IPFN)

Laboratory of Instrumentation and Experimental Particle Physics (LIP)

FUNDING OPPORTUNITIES

The Doctoral Program in Engineering Physics provides the following funding opportunities:

1. Doctoral Programs with their own scholarships, sponsored by the Foundation for Science and Technology (FCT), the national scientific funding agency:
 - Advance Programme in Plasma Science and Engineering (APPLAuSE)
 - Doctoral Programme in the Physics and Mathematics of Information (DP-PMI)
 - International Doctorate Network in Particle Physics, Astrophysics and Cosmology (IDPASC)
 - Advanced Integrated Microsystems (AIM)
2. Individual FCT fellowships
3. Fundação Oriente Doctoral Scholarships for Asian students
4. Scholarships in projects, within the research units associated with the Physics Department

EMPLOYMENT

The graduates in Engineering Physics can integrate research units and R&D laboratories, namely with enterprises, in Portugal or abroad, in the public or the private sectors. These graduates are highly qualified researchers to work in large institutions of research and technological development: European Organization for Nuclear Research (CERN); European Southern Observatory (ESO); European Space Agency (ESA); Joint European Torus (JET); International Thermonuclear Experimental Reactor (ITER).

The PhDs in Physics Engineering can also follow an academic career as Professors of higher education, in national or international universities.

STATUS

In the period 2018–2019, 30 of our graduate students successfully concluded the Doctoral Program in Engineering Physics (3 with the maximum classification of “Approved with Distinction and Honour”).

In this period we have organized an annual meeting with all the students (to welcome the newcomers and present the program, clarifying the steps and rules of the PhD process) and we have appointed “PhD delegates” to represent the students in the hosting research units. As usually, our participation in IST’s annual event PhD Open Days was a great success. In 2019 we contributed to 8% of the posters presented (23% of our PhD students presented a poster at this event), 6% of the competition pitches, 4% of the workshops, and 50% of the prototype exhibitions.

Currently (September 2020), there are 58 students enrolled in the Doctoral Program in Engineering Physics, corresponding to a 21% increase with respect to 2019 (48 students enrolled, and 10 PhD theses concluded).

More information about the Doctoral Program in Engineering Physics is available at our recently updated website: <https://fenix.tecnico.ulisboa.pt/cursos/deft>

DOCTORAL THESES IN PHYSICS

February 8, 2018

Topological phases of free fermions: Geometry, topology, quantum information theory and phase transitions
Student: Bruno Miguel Santos Mera
Supervisor: Vítor João Rocha Vieira
Scientific Area: FMCN

March 6, 2018

Multiple scattering of light in cold atoms: emergence of collective behavior
Student: João Daniel Marques Rodrigues
Supervisor: José Tito da Luz Mendonça
Scientific Area: FPLFN

June 5, 2018

Lattice location of impurities in silicon carbide
Student: Ângelo Rafael Granadeiro Costa
Supervisor: Ulrich Wahl
Scientific Area: FMCN

June 11, 2018

Mesons as relativistic bound states in a Minkowski-space approach
Student: Sofia Isabel Cardoso de Almeida Leitão
Supervisor: Maria Teresa Haderer de la Peña Stadler
Scientific Area: FPFN
Collaboration in supervision: U. Évora

July 02, 2018

Spatio-temporal characterization of high harmonic generation for plasma diagnostics
Student: Jayanath Chalappurath Payyan Koliyadu
Supervisor: Marta Leitão Mota Fajardo
Scientific Area: FPLFN
Collaboration in supervision: LOA, France

July 17, 2018

Non-markovian effects in quantum thermodynamics
Student: Marco Pezzutto
Supervisor: Yasser Rashid Revez Omar
Scientific Area: FMCN
Collaboration in supervision: Queen’s University Belfast, Ireland

July 19, 2018

Quantum information in gravity and in black holes
Student: Benedikt Mark Richter
Supervisor: Yasser Rashid Revez Omar
Scientific Area: AG
Collaboration in supervision: LMU Munich, Germany

September 7, 2018

Quantum walks in cryptography and finite-temperature topological phase transitions
Student: Chrysoula Vlachou
Supervisor: Paulo Alexandre Carreira Mateus
Scientific Area: FMCN

December 3, 2018

Asteroseismology of F and G-type stars: the contribution of the ionization of heavy elements for the stellar dynamics
Student: Ana Olímpia Gonçalves Madeira de Brito
Supervisor: Ilídio Pereira Lopes
Scientific Area: AG

December 19, 2018

Classical and Quantum Thermodynamic Systems in Curved Spacetime
Student: Gonçalo Martins Quinta
Supervisor: José Pizarro de Sande e Lemos
Scientific Area: AG

February 12, 2019

Dark solitons in quantum information theory: dark-soliton qubits
Student: Muzzamal Iqbal Shaukat
Supervisor: Eduardo Filipe Vieira de Castro
Scientific Area: FMCN

February 27, 2019

Optimization of perpendicular anisotropy materials for high performance spin transfer torque devices
Student: Hua Lv
Supervisor: Paulo Jorge Peixeiro de Freitas
Scientific Area: FMCN
Collaboration in supervision: INL, Braga



“Shadows and gravitational lensing of Black Holes interacting with fundamental fields”, PhD thesis, 2019. Image: P. Cunha.

DOCTORAL THESES IN ENGINEERING PHYSICS

April 6, 2018

Controlled plasma wakefield acceleration for particle acceleration towards the energy frontier

Student: Lígia Diana Pinto de Almeida Amorim
Supervisor: Jorge Miguel Ramos Domingues
Ferreira Vieira
Scientific Area: FPLFN

Development, optimization and testing of high performance cooling systems for fusion devices

Student: Giulio Gambetta
Supervisor: Piergiorgio Sonato
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

April 13, 2018

Characterization of the dielectric strength in vacuum of RF drivers for fusion neutral beam injectors

Student: Alberto Maistrello
Supervisor: Francesco Gnesotto
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Power exhaust data analysis and modeling of advanced divertor configurations

Student: Giulio Rubino
Supervisor: Flavio Crisanti
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Investigation of the parameters of a particle beam by numerical models and diagnostic calorimetry

Student: Antonio Pimazzoni
Supervisor: Paolo Bettini
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Magnetic reconnection in fusion plasmas

Student: Luigi Cordaro
Supervisor: Emilio Martines
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Modelling and control of RFX-MOD Tokamak equilibria

Student: Domenico Abate
Supervisor: Fabio Villone
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Napoli Federico II, Italy

New hardware and software technologies for real-time control in nuclear fusion experiments

Student: Marco Gottardo
Supervisor: Leonardo Giudicotti
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Theoretical study and design of a CARM type millimeter wave source

Student: Emanuele Di Palma
Supervisor: Fabio Villone
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

Advanced Thomson scattering techniques as diagnostics for fusion plasmas

Student: Oisín Brian McCormack
Supervisor: Leonardo Giudicotti
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

June 16, 2019

Theoretical and numerical studies of magnetic field generation in plasma astrophysics

Student: Nitin Shukla
Supervisor: Luís Oliveira e Silva
Scientific Area: FPLFN

September 16, 2019

Scalar field effects on the motion of stars

Student: Miguel Coelho Ferreira
Supervisor: Vitor Manuel dos Santos Cardoso
Scientific Area: AG

September 9, 2019

Shadows and gravitational lensing of Black Holes interacting with fundamental fields

Student: Pedro Vieira Pinto da Cunha
Supervisor: Vitor Manuel dos Santos Cardoso
Scientific Area: AG

October 30, 2019

Cosmological and astrophysical applications of modified theories of gravity

Student: João Luís de Figueiredo Rosa
Supervisor: José Pizarro de Sande e Lemos
Scientific Area: AG
Collaboration in supervision: FCUL, Lisboa

September 10, 2019

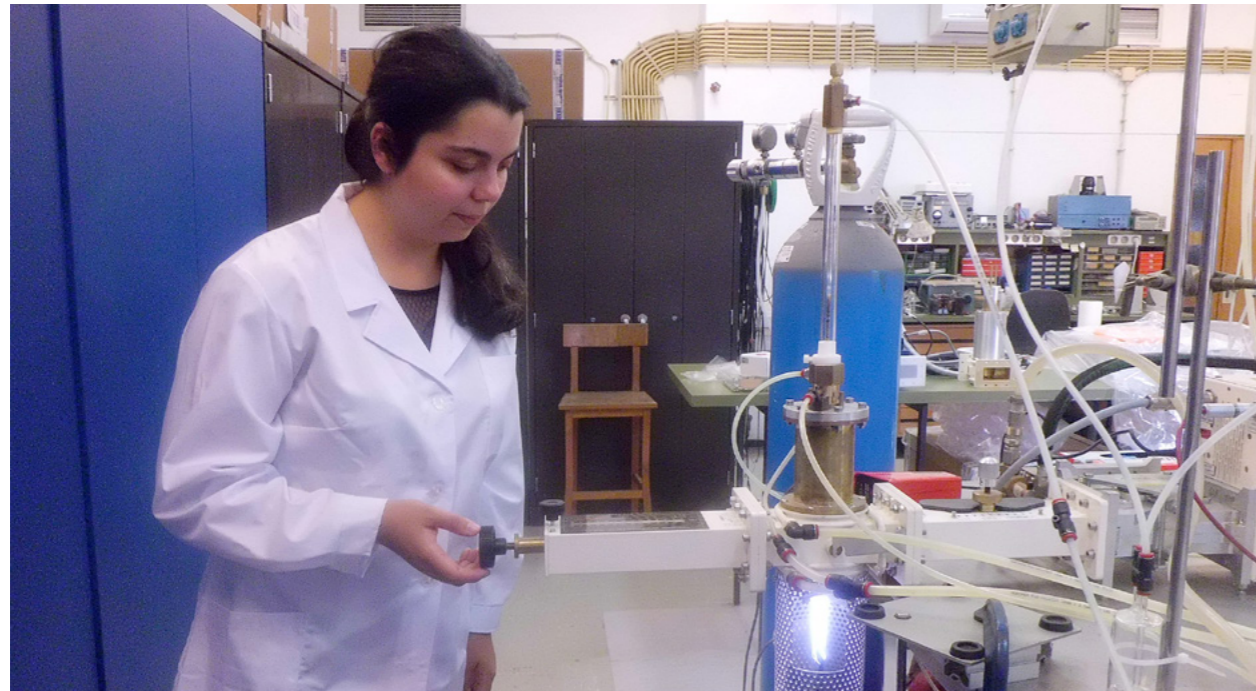
Dynamical behavior of black-hole spacetimes

Student: Kyriakos Destounis
Supervisor: Vitor Manuel dos Santos Cardoso
Scientific Area: AG
Collaboration in supervision: ICSTE – Instituto Universitário de Lisboa

December 23, 2019

Energy extraction from black holes

Student: Filip Hejda
Supervisor: José Pizarro de Sande e Lemos
Scientific Area: AG



“Plasma based assembly and engineering of advanced carbon nanostructures”, PhD thesis, 2018. Image: A. Dias

May 17, 2018

LFS/HFS edge and SOL plasma turbulence studies using fixed frequency reflectometers at AUG
Student: Valentina Nikolaeva
Supervisor: Maria Emília Morais da Fonseca e Silva da Costa Manso
Scientific Area: FPLFN

May 24, 2018

Experimental study of secondary instability to 2/1 magnetic island in COMPASS high density limit plasmas
Student: Syed Ilyas Waseem Shah
Supervisor: Francisco José Baptista Salzedas
Scientific Area: FPLFN
Collaboration in supervision: FCUL, Lisboa and IPP–Prague, Czech Republic

May 25, 2018

Implementation of a X-mode multichannel edge density profile reflectometer for the new ICRH antenna on ASDEX Upgrade
Student: Diogo Elói Trindade de Aguiam
Supervisor: António Guilherme Pereira Ehrhardt Gonçalves Silva
Scientific Area: FPLFN
Collaboration in supervision: Universiteit Gent, Belgium

May 29, 2018

Poloidal Asymmetries at the ASDEX Upgrade tokamak
Student: Luís Manuel Rodrigues Guimarães
Supervisor: Carlos Alberto N. Garcia da Silva
Scientific Area: FPLFN
Collaboration in supervision: Max Planck Institut für Plasmaphysik, Germany

July 3, 2018

ITER control system model: A full-scale simulation platform for the CODAC infrastructure
Student: Martynas Prokopas
Supervisor: Paolo Bettini
Co-Supervisor(s): Jorge Rosa Lopes de Sousa
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy and ITER, France

High-availability control and data acquisition systems for nuclear fusion experiments

Student: Miguel da Gama Falcão Correia
Supervisor: Jorge Rosa Lopes de Sousa
Scientific Area: FPLFN

November 01, 2018

Spectroscopy of microwave plasmas and carbon nanostructures: from the visible to the extreme ultraviolet
Student: Susana Maria Abreu Espinho
Supervisor: Gerardus Maria Wilhelmus Kroesen
Co-Supervisor(s): Elena Stefanova Tatarova
Scientific Area: FPLFN
Collaboration in supervision: TU/e, Eindhoven, The Netherlands

December 04, 2018

Study of irradiation effects in tungsten and production of tungsten alloys for fusion devices
Student: Norberto José Sobral Catarino
Supervisor: Eduardo Jorge da Costa Alves
Scientific Area: FPLFN

Plasma based assembly and engineering of advanced carbon nanostructures

Student: Ana Inês Vicetas de Amaral Dias
Supervisor: Johannes Berndt
Co-Supervisor(s): Elena Stefanova Tatarova, Júlio Paulo Vieira Henriques
Scientific Area: FPLFN
Collaboration in supervision: Université d’Orléans, France

December 5, 2018

Tunneling and spin hall current induced nano-oscillators
Student: Mohammad Tarequzzaman
Supervisor: Paulo Jorge Peixeiro de Freitas
Scientific Area: FMCN
Collaboration in supervision: INL, Braga

January 16, 2019

A moment-based model for edge plasma dynamics at arbitrary collisionality
Student: Rogério Manuel Cabete de Jesus Jorge
Supervisor: Paolo Ricci
Co-Supervisor(s): Nuno Filipe Gomes Loureiro
Scientific Area: FPLFN
Collaboration in supervision: EPFL, Lausanne, Switzerland

March 12, 2019

Development of a fiber-optics polarization resolving THz spectrometer for harsh environment diagnostics application
Student: Giuseppe Galatola Teka
Supervisor: Marco Zerbin
Co-Supervisor(s): Horácio João Matos Fernandes
Scientific Area: FPLFN
Collaboration in supervision: Centro Ricerche Frascati, ENEA, Italy

Phenomenology of plasma-wall interaction using liquid metals in tokamak devices

Student: Matteo Iafrati
Supervisor: Giuseppe Mazzitelli
Co-Supervisor(s): Rui Barrocas Gomes
Scientific Area: FPLFN
Collaboration in supervision: Centro Ricerche Frascati, ENEA, Italy

Neutral beam fast particle physics in fusion plasma integrated scenarios

Student: Matteo Vallar
Supervisor: Tommaso Bolzonella
Co-Supervisor(s): Artur Jorge Louzeiro Malaquias
Scientific Area: FPLFN
Collaboration in supervision: Università degli Studi di Padova, Italy

May 2, 2019

Liquid tin and lithium-tin as plasma facing components for nuclear fusion devices
Student: João Pedro Simões Loureiro
Supervisor: Horácio João Matos Fernandes
Co-Supervisor(s): Giuseppe Mazzitelli; Rui Barrocas Gomes
Scientific Area: FPLFN
Collaboration in supervision: Centro Ricerche Frascati, ENEA, Italy

July 25, 2019

Development of a directionality detector and radiation hardness assurance for RADEM, the ESA JUICE mission radiation monitor
Student: Marco Gui Alves Pinto
Supervisor: Patrícia Carla Serrano Gonçalves
Scientific Area: FPFN

July 26, 2019

ISTTOK plasma characterization and control by the heavy ion beam diagnostic
Student: Rafael Bagagem Henriques
Supervisor: Artur Malaquias
Co-Supervisor(s): Carlos Garcia da Silva
Scientific Area: FPLFN

September 25, 2019

System manager architecture for critical instrumentation in nuclear fusion
Student: Paulo Ricardo Fortuna Carvalho
Supervisor: António Pinto Rodrigues
Co-Supervisor(s): Bernardo Brotas de Carvalho
Scientific Area: FPLFN

October 2, 2019

Energy storage and transfer in non-equilibrium CO₂ plasmas

Student: Marija Grofulovic

Supervisor: Richard Antonius Hendricus Engeln

Co-Supervisor(s): Vasco A. Dinis Leitão Guerra

Scientific Area: FPLFN

Collaboration in supervision: Fac. Applied Physics, TU/e, Eindhoven, The Netherlands

October 16, 2019

Development of new high-performance positron emission mammography based on silicon photomultipliers and optimized detector geometry

Student: Tahereh Sadat Niknejad

Supervisor: João Varela

Co-Supervisor(s): Stefaan Tavernier

Scientific Area: FPFN

Collaboration in supervision: Vrije Universiteit, Brussel, Belgium

Cake celebrating 30 years of MEFT.



MASTER THESES

January 4, 2018

Material optimization: Magnetic thin films and advanced spintronic devices

Student: Rafael Girão Henriques da Costa Santos

Supervisor: Susana Isabel Pinheiro Cardoso de Freitas

Scientific Area: FMCN

June 5, 2018

Cosmological solutions with black holes

Student: António Eduardo Santos Carvalho

Supervisor: José Pizarro de Sande e Lemos

Scientific Area: AG

January 31, 2018

Entanglement-induced deviation from the geodesic motion in quantum gravity: Gravity-matter entanglement and the weak equivalence principle

Student: Francisco de Sá Ferreira Loureiro Pipa

Supervisor: Vítor Manuel dos Santos Cardoso

Scientific Area: AG

Cyclic cosmologies

Student: Inês Margarida da Silva Terrucha

Supervisor: José Pizarro de Sande e Lemos

Scientific Area: AG

June 6, 2018

Characterization of echoes: toy models and compact objects

Student: Miguel Alexandre Ribeiro Correia

Supervisor: Vítor Manuel dos Santos Cardoso

Scientific Area: AG

May 21, 2018

Measurement of b-quark fragmentation fraction ratios at the CMS experiment: a key ingredient for the Bs->mu mu rare decay analysis

Student: Bruno Afonso Fontana Santos Alves

Supervisor: Nuno Teotónio Viegas Guerreiro

Leonardo

Scientific Area: FPFN

June 7, 2018

Magnus effect in General Relativity

Student: Rita Morais Franco

Supervisor: Vítor Manuel dos Santos Cardoso

Scientific Area: AG

May 28, 2018

Effects of shear flow on the stability of Tokamak plasmas

Student: Josué Resende de Andrade Lopes

Supervisor: Rui Miguel Dias Alves Coelho

Scientific Area: FPLFN

June 8, 2018

Correcções quânticas nas equações cinéticas

Student: João O'Neill Cortes

Supervisor: João Pedro Saraiva Bizarro

Scientific Area: FPLFN

May 28, 2018

Deployment of a bubble chamber for dark matter searches

Student: Marta Neves dos Reis

Supervisor: Miguel António Felizardo da Costa

Scientific Area: FPFN

Numerical implementation and exploitation of a two-field model of the scrape-off layer of a tokamak

Student: Luís Alexandre Rosalino Venâncio

Supervisor: João Pedro Saraiva Bizarro

Scientific Area: FPLFN

May 29, 2018

On-chip organic crystal photosensor

Student: João Miguel Pinto dos Santos Serra

Supervisor: Helena Cristina Ramos Jerónimo

Dias Alves

Scientific Area: FMCN

June 11, 2018

Shallow water intrusion detection system: Smart underwater sensor network

Student: Abhishek Gupta

Supervisor: Susana Isabel Pinheiro Cardoso de Freitas

Scientific Area: FMCN

- June 12, 2018
Optimization of magnetoresistive sensors for high power applications
Student: Mafalda Vieira Garcia de Oliveira
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- June 14, 2018
Measuring strain caused by ion implantation in GaN
Student: Pedro José de Sousa Mendes
Supervisor: Katharina Lorenz
Scientific Area: FMCN
- Computational toolkit for plasma physics education*
Student: Rui Pedro Salgado Paiva Calado
Supervisor: Jorge Miguel Ramos Domingues Ferreira Vieira
Scientific Area: FPLFN
- June 15, 2018
Optimização dos consumos energéticos para orientação solar com seguimento no eixo polar
Student: Miguel Gonçalves da Silva Machado
Supervisor: Luís Filipe Moreira Mendes
Co-Supervisor: Carlos Augusto Santos Silva
Scientific Area: FI
- Hybrid PVT solar systems optimization for household applications*
Student: Miguel de Abreu Castelo Branco Carneiro
Supervisor: Luís Filipe Moreira Mendes
Co-Supervisor: António Luiz Moura Joyce
Scientific Area: FI
- September 21, 2018
Multi-Higgs models, flavour and CP violation
Student: João Aparício Pereira Magalhães Alves
Supervisor: Gustavo da Fonseca Castelo Branco
Scientific Area: FPFN
- September 24, 2018
The phase diagram of the Haldane–Falicov–Kimball model
Student: Miguel de Jesus Mestre Gonçalves
Supervisor: Eduardo Filipe Vieira de Castro
Co-Supervisor: Pedro José Gonçalves Ribeiro
Scientific Area: FMCN
- October 17, 2018
Aspects of physics beyond the standard model in the leptonic sector
Student: Pedro Manuel Ferreira Pereira
Supervisor: Maria Margarida Nesbitt Rebelo da Silva
Scientific Area: FPFN
- October 30, 2018
The role of argon in CO₂ dissociation
Student: Ana Filipa Sovelas da Silva
Supervisor: Vasco António Dinis Leitão Guerra
Co-Supervisor: Olivier Guaitella
Scientific Area: FPLFN
- October 31, 2018
Modelling ultra-high frequency x-ray emission in particle in cell codes
Student: Miguel José Ferreira Pardal
Supervisor: Jorge Miguel Vieira
Co-Supervisor: Ricardo Azambuja Fonseca
Scientific Area: FPLFN
- June 21, 2018
Adaptive neural networks based on metal-insulator-metal nanostructures (Memristors)
Student: Tomás Alexandre Bragança Pereira Martins
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- July 20, 2018
Gravitational waves and massive gravitons
Student: Gonçalo Cabrita e Castro
Supervisor: Vítor Manuel dos Santos Cardoso
Scientific Area: AG
- September 14, 2018
Depth distribution of particles in plastics in sea-water
Student: Nicolò Tuccori
Supervisor: Maria Teresa Haderer de la Peña Stadler
Scientific Area: FPFN
- October 16, 2018
Plasma tomography with machine learning
Student: Diogo Duarte Parente Godinho Soares de Carvalho
Supervisor: Horácio João Matos Fernandes
Scientific Area: FPLFN
- October 18, 2018
Volatility models in option pricing
Student: Miguel Ângelo Maia Ribeiro
Supervisor: Rui Manuel Agostinho Dilão
Scientific Area: FI
- October 25, 2018
On the energy transport in a non-integrable Ising chain
Student: João dos Santos Ferreira
Supervisor: Pedro José Gonçalves Ribeiro
Scientific Area: FMCN
- November 6, 2018
Exotic compact objects interacting with fundamental fields
Student: Nuno André Moreira Santos
Supervisor: Vítor Manuel dos Santos Cardoso
Scientific Area: AG
- November 7, 2018
Radioactive hot-spot detection using unmanned aerial vehicle surveillance
Student: Duarte Félix Macedo
Supervisor: Horácio João Matos Fernandes
Scientific Area: FPLFN
- Microwave plasmas applied for synthesis of advanced free-standing carbon nanostructures*
Student: Luís Filipe Xavier da Silva
Supervisor: Bruno Miguel Soares Gonçalves
Scientific Area: FPLFN
- November 8, 2018
X-ray optics
Student: Patrícia Neves M. de Carvalho Estrela
Supervisor: Diana Cristina Pinto Leitão
Scientific Area: FMCN
- November 9, 2018
Magnetic sensors in tube for particle detection
Student: Mafalda Maria Vieira Ferreira
Supervisor: Diana Cristina Pinto Leitão
Scientific Area: FMCN
- Smart sensors with minimal invasive profile for dog biometrics in search and rescue operations*
Student: Nuno Miguel Oliveira Milhomens
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- November 12, 2018
Prospective study of highly boosted Higgs pairs decaying to four b quarks
Student: Ana Luísa Moreira de Carvalho
Supervisor: José Ricardo Gonçalves
Co-Supervisor: Pedro Morais Salgueiro Teixeira de Abreu
Scientific Area: FPFN
- Study of ttH production with H→bb in ATLAS at the HL-LHC*
Student: António Manuel Mendes Jacques da Costa
Supervisor: José Ricardo Gonçalves
Co-Supervisor: Pedro Morais Salgueiro Teixeira de Abreu
Scientific Area: FPFN
- November 13, 2018
Pre-deposited heavily P doped a-Si:H as dopant source in n+/p junctions for photovoltaic applications
Student: Rúben Gil Bernardo Pereira
Supervisor: Ana Maria H. Branquinho de Amaral
Scientific Area: FMCN
- November 14, 2018
Machine learning controlled plasma based acceleration
Student: Bernardo Farinha Malaca
Supervisor: Jorge Miguel Ramos Domingues Ferreira Vieira
Scientific Area: FPLFN
- November 15, 2018
Current induced switching in sub-micrometric perpendicular magnetic anisotropy MTJs
Student: João Fidalgo da Silva
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- November 16, 2018
Magnetoresistive sensors for industrial positioning application
Student: Sofia Alexandra Cruz Abrunhosa
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- Optimization of magnetoresistive sensors for integrated biometric robotic devices*
Student: Telmo Pereira Fontoura
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMCN
- November 20, 2018
Activation of carbon dioxide and methane by non-equilibrium plasmas
Student: Henrique Ferreira Carvalho Leal Rodrigues
Supervisor: Vasco António Dinis Leitão Guerra
Scientific Area: FPLFN
- Molecule formation on surfaces in oxygen containing plasmas*
Student: Maria Carolina Amoedo Gonçalves
Supervisor: Vasco António Dinis Leitão Guerra
Scientific Area: FPLFN
- Local probe studies in Jahn-Teller distorted manganites*
Student: Ricardo César Carvalho Teixeira
Supervisor: Pedro José Oliveira Sebastião
Scientific Area: FMCN
- November 23, 2018

Compression of ultrahigh power laser pulses

Student: Luís Melo de Matos Salazar Braga
 Supervisor: Gonalo Nuno Marmelo Foito Figueira
 Scientific Area: FPLFN

November 26, 2018

The spatial structure of surround modulation in mouse visual cortex

Student: Beatriz Ferreira Belbut
 Supervisor: Bruno Miguel Soares Gonalves
 Scientific Area: FPLFN

November 27, 2018

Development of a QMC code to tackle interacting electronic systems in 2D with application to TMD nanoribbons

Student: Francisco Monteiro de Oliveira Brito
 Supervisor: Eduardo Filipe Vieira de Castro
 Scientific Area: FMCN

November 29, 2018

Evolution of cooperation through graduated punishment

Student: Marta Gomes da Cunha Couto
 Supervisor: Jose Lus Rodrigues Julio Martins
 Scientific Area: FPLFN

Machine learning for quantum phase estimation

Student: Nelson Filipe Ferreira de Almeida Costa
 Supervisor: Joo Carlos Carvalho de Sa Seixas
 Scientific Area: FMCN

November 30, 2018

Quantum perceptrons

Student: Francisco Horta Ferreira da Silva
 Supervisor: Joo Carlos Carvalho de Sa Seixas
 Scientific Area: FMCN

Magnetoresistive stacks with improved thermal resilience

Student: Pedro David Rosa Araujo
 Supervisor: Diana Cristina Pinto Leitao
 Scientific Area: FMCN

February 21, 2019

Indirect field oriented control of two-phase induction machines

Student: Alexandre Jose Fabiao Aparicio
 Supervisor: Horacio Joo Matos Fernandes
 Scientific Area: FPLFN

March 29, 2019

Spin transfer dynamics in nano-oscillators: from radio-frequency signal detection to energy recovery and transmission

Student: Mafalda Jotta Garcia
 Supervisor: Susana Isabel Pinheiro Cardoso Freitas
 Scientific Area: FMCN

April 24, 2019

Semiconductor triplet sensitizer for triplet fusion upconversion: Photoexcited carriers in thin-film organolead-halide perovskite driving triplet formation and photon upconversion in rubrene

Student: Frederik Pinto Correia Eistrup
 Supervisor: Pedro Miguel Felix Brogueira
 Scientific Area: FMCN

June 12, 2019

Terahertz plasmonic instabilities in graphene: hydrodynamical description

Student: Pedro Afonso Cosme e Silva
 Supervisor: Hugo Fernando Santos Teras
 Scientific Area: FPLFN

June 19, 2019

Neutronic studies of an irradiation facility coupled to a proton cyclotron

Student: Joo Pedro Oliveira Loureno
 Supervisor: Maria Teresa Haderer
 de la Pena Stadler
 Scientific Area: FPFN

Charged-particle dynamics and interaction with Alfven waves in fusion plasmas

Student: Mariana do Nascimento Martins
 Supervisor: Paulo Jorge Rodrigues
 Scientific Area: FPLFN

Machine Learning algorithms to forecast the use of electrical appliances in the residential sector

Student: Sebastiao Maria Vilela Carvalho de Moura
 Supervisor: Carlos Manuel dos Santos Rodrigues da Cruz
 Scientific Area: FMCN

June 25, 2019

Mapeamento das alteraes EEG com estimulao auditiva

Student: Marco Paulo Pinheiro Miranda
 Supervisor: Maria Teresa Ferreira Marques Pinheiro
 Scientific Area: FI

Implementation of biplanar coils for magnetic field generation

Student: Miguel Maria Abreu Condesso
 Supervisor: Pedro Jose Oliveira Sebastiao
 Scientific Area: FMCN

June 26, 2019

Spherical rotor asynchronous motor control by 3D variable-frequency drive

Student: Joo Antonio Silva Oliveira
 Supervisor: Horacio Joo Matos Fernandes
 Scientific Area: FPLFN

June 27, 2019

Analysis of in-flight data from ESA's AlphaSat environment and effects facility multi-functional spectrometer

Student: Filipe Maximo Ribeiro Lopes de Carvalho
 Supervisor: Patricia Carla Serrano Gonalves
 Scientific Area: FPFN

Reconstruction of plasma boundaries in ISTTOK

Student: Rafael Del Barco Peres dos Santos
 Supervisor: Rui Miguel Dias Alves Coelho
 Scientific Area: FPLFN

June 28, 2019

Modelling propagation of wildfires using cellular automata

Student: Barbara Teixeira de Sousa Coelho da Mota
 Supervisor: Carlos do Carmo de Portugal e Castro da Camara
 Scientific Area: FI

July 2, 2019

Estudo de edifcios de balano zero na cidade de Lisboa

Student: Carlos Filipe Duarte de Sousa
 Supervisor: Carlos Augusto Santos Silva
 Scientific Area: FI

July 4, 2019

Experimental characterization of the double stage Hall thruster ID-Hall by retarding potential analyzer

Student: Jose Maria de Sequeira Mealha Beck Senart
 Supervisor: Mario Jose Gonalves Pinheiro
 Scientific Area: FPLFN

July 17, 2019

Core magnetic field imprint in the nonradial oscillations of red giant stars

Student: Pedro Nuno David Gomes
 Supervisor: Ilidio Pereira Lopes
 Scientific Area: AG

July 22, 2019

Spontaneous scalarization of charged black holes

Student: Pedro Gonalo da Silva Fernandes
 Supervisor: Carlos Alberto Ruivo Herdeiro
 Scientific Area: AG

September 13, 2019

Dissipation and decoherence for generic open quantum systems: Spectral and steady-state properties of random Liouvilian operators

Student: Lucas de Barros Pacheco Seara de Sa
 Supervisor: Pedro Jose Gonalves Ribeiro
 Scientific Area: FMCN

September 27, 2019

Measurement-device-independent quantum key distribution

Student: Jorge Miguel Ferreira Marques
 Supervisor: Joo Carlos Carvalho de Sa Seixas
 Scientific Area: FPFN

October 10, 2019

Limit-cycle model for internal-transport-barrier oscillations

Student: Antonio Joo Caeiro Heitor Coelho
 Supervisor: Joo Pedro Saraiva Bizarro
 Scientific Area: FPLFN

October 24, 2019

Strong lensing of light and shadow of a Black Hole surrounded by a heavy accretion disk

Student: Nelson Antonio Eiro da Silva
 Supervisor: Carlos Alberto Ruivo Herdeiro
 Scientific Area: AG

October 30, 2019

The impact of electric field distortion on CP-Violation studies

Student: Gloria Elizabeth Conceio Andrade de Sa Pereira
 Supervisor: Fernando Jose De Carvalho Barao
 Scientific Area: FPFN

October 31, 2019

Probing the quark gluon plasma medium through B meson production measurements in PbPb collisions at the LHC

Student: Julia Manuela Cardoso Silva
 Supervisor: Nuno Teotonio Viegas Guerreiro Leonardo
 Scientific Area: FPFN

November 7, 2019

Control of a passive and autonomous parafoil cargo delivery system

Student: Francisco Manuel Pereira Carrola
 Supervisor: Horacio Joo Matos Fernandes
 Scientific Area: FPLFN

ISTTOK tomography with machine learning

Student: Ruben Valentim Alves Cardoso
 Supervisor: Horacio Joo Matos Fernandes
 Scientific Area: FPLFN

November 11, 2019

Some theoretical aspects of multi-Higgs-doublet models

Student: Francisco Santiago Monteiro Faro
 Supervisor: Jorge M. Rodrigues Crispim Romao
 Scientific Area: FPFN

A C++ API for the implementation of software-defined-radio NMR spectrometers

Student: João Diogo Campos Franco
Supervisor: Pedro José Oliveira Sebastião
Scientific Area: FMCN

November 11, 2019

Dirac neutrinos in the 2HDM with maximally-restrictive Abelian symmetries

Student: Simão Soares da Cunha Correia
Supervisor: Filipe Rafael Joaquim
Scientific Area: PPFN

Atomic oxygen kinetics in CO₂ plasmas

Student: Tiago Cunha Dias
Supervisor: Vasco António Dinis Leitão Guerra
Scientific Area: FPLFN

November 14, 2019

Implementation of gate set tomography on quantum hardware

Student: Henrique Guimarães Silvério
Supervisor: Pedro José Gonçalves Ribeiro
Scientific Area: FMCN

November 20, 2019

Spintronic antennas for energy harvesting from power lines

Student: Rafaela Haupt Ribeiro
Supervisor: Susana Isabel Pinheiro Cardoso de Freitas
Scientific Area: FMC

November 21, 2019

ISTTOK plasma tomography using minimum Fisher regularization

Student: Daniel Hachmeister Ferreira da Costa
Supervisor: Horácio João Matos Fernandes
Scientific Area: FPLFN

November 26, 2019

Jet quenching in small systems

Student: Bruno Miguel Tavares Lopes da Silva
Supervisor: José Guilherme Teixeira de Almeida Milhano
Scientific Area: PPFN

November 27, 2019

Classifying heavy ion jets

Student: João Pedro De Arruda Gonçalves
Supervisor: José Guilherme Teixeira de Almeida Milhano
Scientific Area: PPFN

November 28, 2019

Transient analysis of an open-cell foam volumetric receiver

Student: Miguel Ferreira Mora
Supervisor: Luís Filipe Moreira Mendes
Scientific Area: FI

Development of an in-flight EEE component test system with integrated radiation monitoring for TID measurement

Student: Pedro Manuel Gom Moreira
Supervisor: Pedro Jorge dos Santos de Assis
Scientific Area: PPFN

November 29, 2019

Orbital angular momentum and polarization in a BB84 protocol

Student: André Eusébio Franco Rodrigues
Supervisor: João Carlos Carvalho de Sá Seixas
Scientific Area: PPFN

November 29, 2019

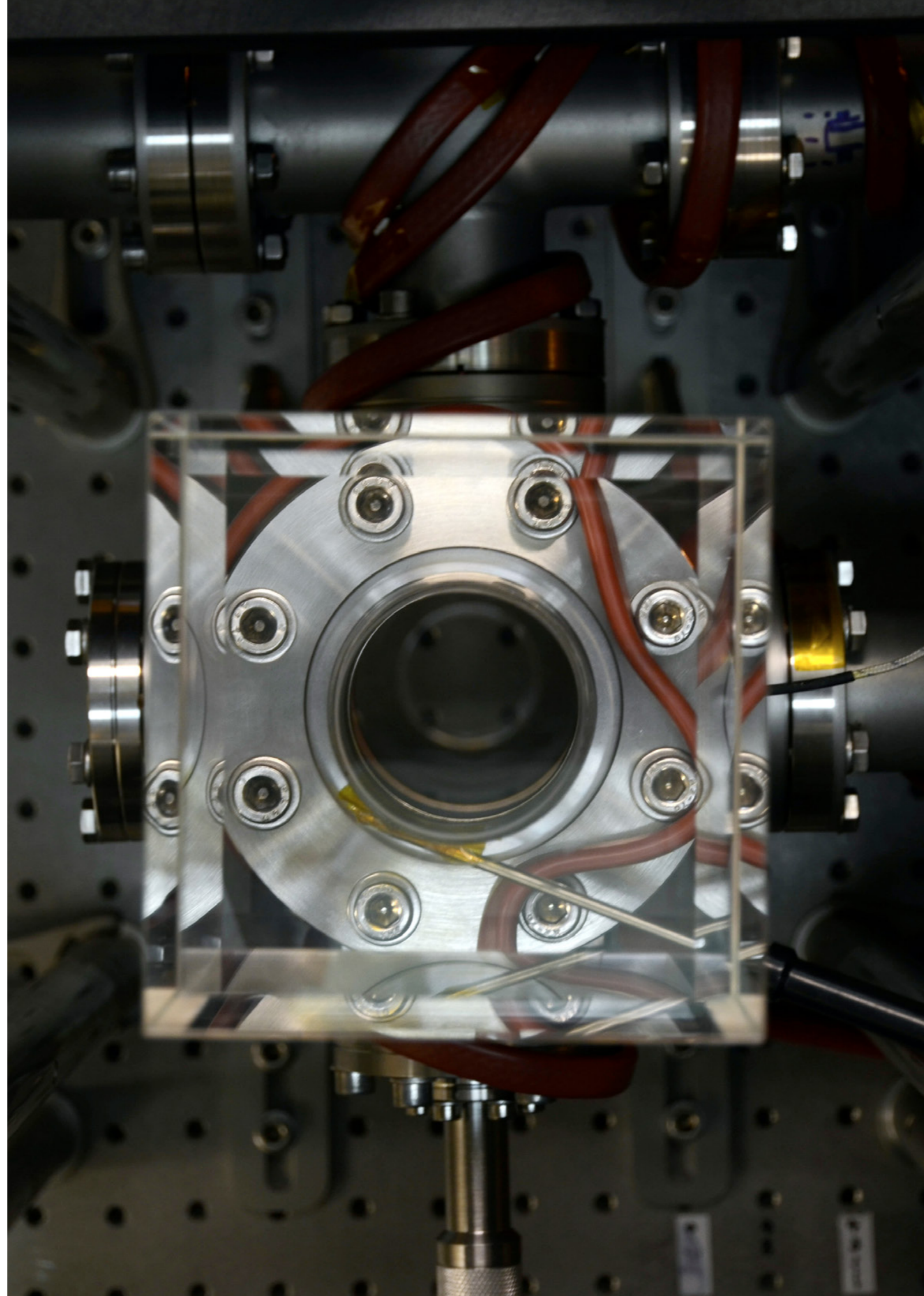
Quantum simulations of hadronic systems

Student: Diogo Da Silva Duarte Cruz
Supervisor: João Carlos Carvalho de Sá Seixas
Scientific Area: PPFN

December 2, 2019

Search for exclusively produced top quark pairs at the LHC

Student: Beatriz Ribeiro Lopes
Supervisor: João Manuel Coelho dos Santos Varela
Scientific Area: PPFN



PEDAGOGICAL HONOURS AND AWARDS

TEACHING AWARDS

In 2017/2018 and 2018/2019, the following teachers of DF (Faculty and Collaborators) were recognized for their excellence in teaching:

Amílcar José Ferros Praxedes
EO (MEM+MEAmbi)

Ana Luísa Moreira de Carvalho
EO (LEIC-T)

Ana Maria Mourão
MO (LEIC-A)

André Filipe Mocho Costa Lopes
TEM (MEEC)

António Jorge Duarte de Castro Silvestre
EO (MEEC)

Bruno Valeixo Bento
MO (LEIC-A)

Diana Cristina Pinto Leitão
FTMM (MEFT),
TMNF (MEM, MEQ, MBioNano, MEFT)

Eduardo Filipe Vieira de Castro
EO (MEEC)

Gonçalo Nuno Marmelo Foito Figueira
Opticas and Lasers (MEFT)

Hugo Filipe de Almeida Pires
LIFE (MEFT)

João Luís Figueiredo Rosa
EO (MEC+LEGM), MO (MEQ+MEBiol
+MEM), TEM (MEC+LEGM)

João Paulo Ferreira da Silva
EO (MEEC), MQ1 (MEFT)

José Maria Vargas Lopes
MO (MEMec+LENO), EO (MEC+LEGM)

Liliana Marisa Cunha Apolinário
OO (MEFT)

Luís Filipe Moreira Mendes
TE (MEFT), ESF (MEGE, MEFT)

Luís Humberto Viseu Melo
LID (MEFT)

Luís Paulo da Mota Capitão Lemos Alves
EO (MEEC), TEM (MEEC)

Manuel Peres Alonso
Física (MA)

Maria Joana Patrício Gonçalves de Sá
II (MEFT)

Marta Leitão Mota Fajardo
EO (MEC+LEGM)

Miguel Reis Orcinha
FC (MEFT)

Pedro Francisco de Deus Lourenço
Microcontrollers (MEFT)

Pedro Gonçalo da Silva Fernandes
TEM (MEC, LEGM)

Pedro Jorge dos Santos Assis
MO (MEBiom, LMAC, LEGM),
O (MEC, LEGM)



Top: DF faculty receive their excellence in teaching awards in 2018. Right: The ceremony celebrating “Dia do Técnico”, during which several members of the school’s faculty and staff were honoured. Image: Técnico Lisboa.



Pedro Miguel Félix Brogueira
MO (MEAer)

Raul Luís
MO (MEAmbi, LEGM), EO (MEC, LEGM)

Ricardo Faleiro
MO (MEMec+LEAN)

Rodrigo Luís Lourenço Vicente
TEM (MEEC)

Ruben Maurício da Silva Conceição
EO (LEIC-A)

Samuel Rodrigues Martins Eleutério
Programming (MEFT)

Simão Soares da Cunha Correia
MO (MEAer)

Vânia Silvério
TMNF (MEM, MEQ, MBioNano, MEFT)

Vítor Manuel dos Santos Cardoso
EO (LEIC-A)



First cycle student *Lucas de Sá* received the prize for best thesis in the scientific area of Condensed Matter and Nanotechnology. Image: Técnico Lisboa.

Condensed Matter and Nanotechnology

The phase diagram of the Haldane-Falicov-Kimball model
Miguel de Jesus Mestre Gonçalves

Dissipation and decoherence for generic open quantum systems: Spectral and steady-state properties of random Liouvilian operators
Lucas de Barros Pacheco Seara de Sá

Interdisciplinary Physics

Volatility models in option pricing
Miguel Ângelo Maia Ribeiro

Transient analysis of an open-cell foam volumetric receiver
Miguel Ferreira Mora

Particle and Nuclear Physics

Multi-Higgs models, flavour and CP violation
João Aparício Pereira Magalhães Alves

Dirac neutrinos in the 2HDM with maximally-restrictive Abelian symmetries
Simão Soares da Cunha Correia

Plasma Physics, Lasers and Nuclear Fusion

Modelling ultra-high frequency x-ray emission in particle cell codes
Miguel José Ferreira Pardal

Limit-cycle model for internal-transport-barrier oscillations
António João Caeiro Heitor Coelho

In 2018 the important distinction “Prémio Maria de Lurdes Pintasilgo” was attributed, in the category Young Alumni, to the recently MEFT graduate Mariana Henriques de Araújo, for her dissertation and her outstanding academic career.

In 2018, MEFT graduate *Mariana Henriques de Araújo* was awarded the “Prémio Maria de Lurdes Pintasilgo”.



STUDENTS AWARDS

In 2017/2018, several students of MEFT were recognized for their academic excellence.

José Luís Sampaio de Figueiredo was awarded the Prize “Academic Excellence in MEFT”, introduced in 2017 by DF and MEFT.

The following students were awarded Honorable mention in “Academic Excellence in MEFT” in 2018:

Madalena Carvalho Lourenço

Beatriz Cardoso Dias

In 2018/2019, several students of MEFT were recognized for their academic excellence:

Miguel Alexandre Jesus da Silva Martins was awarded the Prize “Academic Excellence in MEFT”.

The following students were awarded Honorable mention in “Academic Excellence in MEFT” in 2019:

Pedro Alexandre Palma Piçarra

Duarte Magalhães Esteves

The following students were awarded the prizes of “Best MSc Theses” within the different scientific areas in 2017/2018 and 2018/2019, respectively:

Astrophysics and Gravitation

Characterization of echoes: toy models and compact objects
Miguel Alexandre Ribeiro Correia

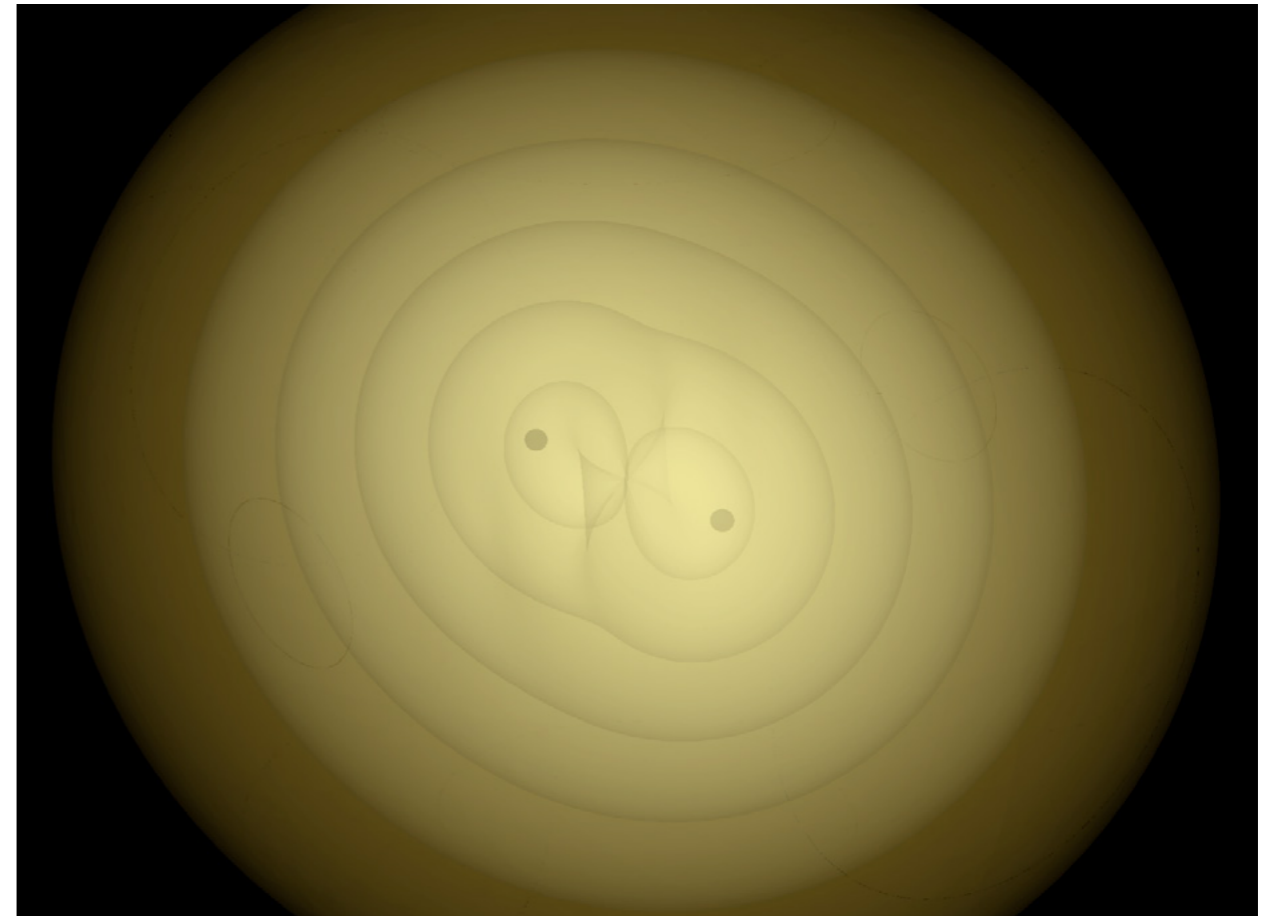
Core magnetic field imprint in the nonradial oscillations of red giant stars

Pedro Nuno David Gomes



SCIENTIFIC AREAS

ASTROPHYSICS AND GRAVITATION

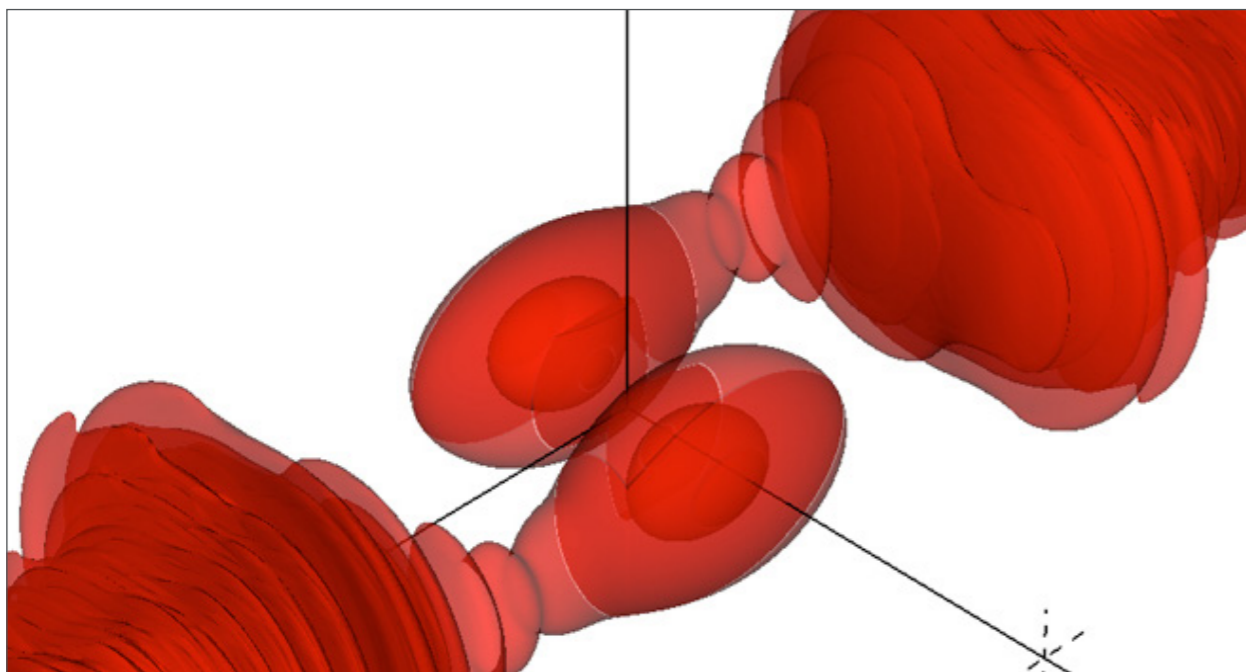


A black hole binary. Image: M. Zilhão/CENTRA.

Our ability to understand gravity is at a turning point. The LIGO/Virgo gravitational-wave detections, the imaging of a black hole shadow by long-baseline interferometry, and ever more precise observations across all electromagnetic wavelengths have opened an unprecedented window onto gravity at its strongest. Driven by these momentous events, gravitational physics is experiencing a revolution, and is an exciting line of research with an immense discovery potential.

Black holes are the simplest, most compact, and physically elusive macroscopic objects in the

Universe. They will play a central role in this new era in physics and astronomy. Among astronomical targets, black holes are extraordinary in their ability to convert energy into electromagnetic and gravitational radiation. Meanwhile, the study of their stability and dynamics challenges our knowledge of partial differential equations, of numerical methods, and of the interplay between quantum field theory and the geometry of spacetime. The BH information paradox and the existence of unresolved singularities in classical general relativity point to deep inconsistencies in our current understanding of gravity



Tidally disrupted bosonic cloud. Image: T. Ikeda/CENTRA.

and quantum mechanics. These difficulties lie at the heart of recent groundbreaking ideas such as the relationship between entanglement entropy and geometry, and drive efforts to complete the theory of semi-classical gravity. In particular, this led to recent progress on the infrared structure of both gravity and quantum field theory, linking memory effects, soft theorems and asymptotic symmetries. It is becoming clear that the main conceptual problems in BH physics hold the key to many fundamental issues in theoretical physics. Our ability to scrutinize BHs through observations must then match — and be informed by — theoretical advances.

But the invisible universe is vast. The nature and properties of dark matter are arguably among the most important open issues in science. Interesting candidates for dark matter include weakly interacting heavy particles or light bosonic fields, of which the axion or axion-like particles are prototypical examples. The formation of baryonic structures in our universe from the smallest to the largest objects — stars, stellar clusters, molecular clouds and H II regions, galaxies and galaxy clusters and superclusters — results from the action of gravity combined with other fundamental forces on baryons, dark matter and dark energy.

We thus aim to understand gravity, dark matter and dark energy. Was Einstein right? Is gravity really described by Einstein equations? What is the nature

of the graviton? Is the event horizon of a black hole exactly as described by General Relativity? Do black holes have no hair? Are black holes deformable? What happens to dark matter once it falls into the Sun or into other stars? What is the nature of dark energy? These are some of the most fundamental and pressing questions in physics that one will be able to answer in the next few years.

Astrophysics and Gravitation area is the right place to be. We belong to the largest and most active group in the country working in astrophysics and gravitation, recognized by the European Research Council as of outstanding quality. We are leading theoretical physicists, interpreting LIGO's observations and predicting new phenomena. We work on state-of-the-art observatories such as GRAVITY, now mapping the black hole at the center of our galaxy. We are leaders in stellar structure, evolution and in the use of stars as dark matter probes. We observe with the largest telescopes in the world including the ESO Very Large Telescope, in Chile, and also in numerical simulations or instrumentation for some of the largest experiments in the world.

Our group comprises students and researchers from over 10 countries. Our students have had successful careers in some of the most famous institutes world-wide... Do you want to know more? Schedule a visit to our group, all it takes is an email!

TEACHING ACTIVITIES

MSc curricular units:

Relativity and Cosmology
Astrophysics
Topics in General Relativity and Cosmology
Astrophysics Laboratory
Topics in Particle Physics, Astrophysics and Cosmology

PhD curricular units:

Advanced Topics in General Relativity, Astrophysics and Cosmology I
Advanced Topics in General Relativity, Astrophysics and Cosmology II

MEMBERS

Vitor Cardoso
Full Professor (Area Coordinator)

Amaro Rica da Silva
Assistant Professor

José Sande Lemos
Full Professor

David Hilditch
Invited Assistant Professor

Ilídio Lopes
Associate Professor with "Agregação"

Santiago González Gaitán
Invited Assistant Professor

Ana Maria Mourão
Associate Professor

WEBSITE

<https://fenix.tecnico.ulisboa.pt/areacientifica/df/ac-ag>

CONTACT

Secretariat: +351 218417938

CONDENSED MATTER AND NANOTECHNOLOGY

Condensed matter physics deals with the macroscopic and microscopic physical properties of matter in condensed phases. The most familiar examples of condensed phases are solids and liquids that arise from the electromagnetic interaction between atoms. Almost all of the physical world that we interact with in our daily lives is in fact condensed matter, the notable exceptions being light and air. Apparently simple questions like why do metals feel cold or why is glass transparent, are answered by condensed matter physics. Of special interest in condensed matter physics are the different phases of matter, from the magnetism known since antiquity to the topological insulators that were unknown until a few years ago. Topics included in the condensed matter field range from the very practical to the highly theoretical.

CONDENSED MATTER PHYSICS: FROM SCIENCE TO TECHNOLOGY

The development of condensed matter physics over the last century allowed us to engineer materials with remarkable properties that changed our society. The electronic industry is based on semiconducting transistors, liquid crystals revolutionized displays, magnetism and spintronics allowed the storage of massive amounts of data, lasers and optical fibers revolutionized communications. Deep knowledge of physics of condensed matter obtained from the measurement of properties with clever experimental probes in the laboratory along the development of techniques of theoretical physics to develop mathematical models and with tools for simulations, stands behind this fantastic technological progress.

Condensed matter physics has been a source of shared new ideas with other fields of Physics, from the renormalization group theory to topological quantum fields, or even the Brout-Englert-Higgs mechanism that is behind the Higgs boson. It is also perhaps the best laboratory we have to test exotic quantum and statistical physics effects.

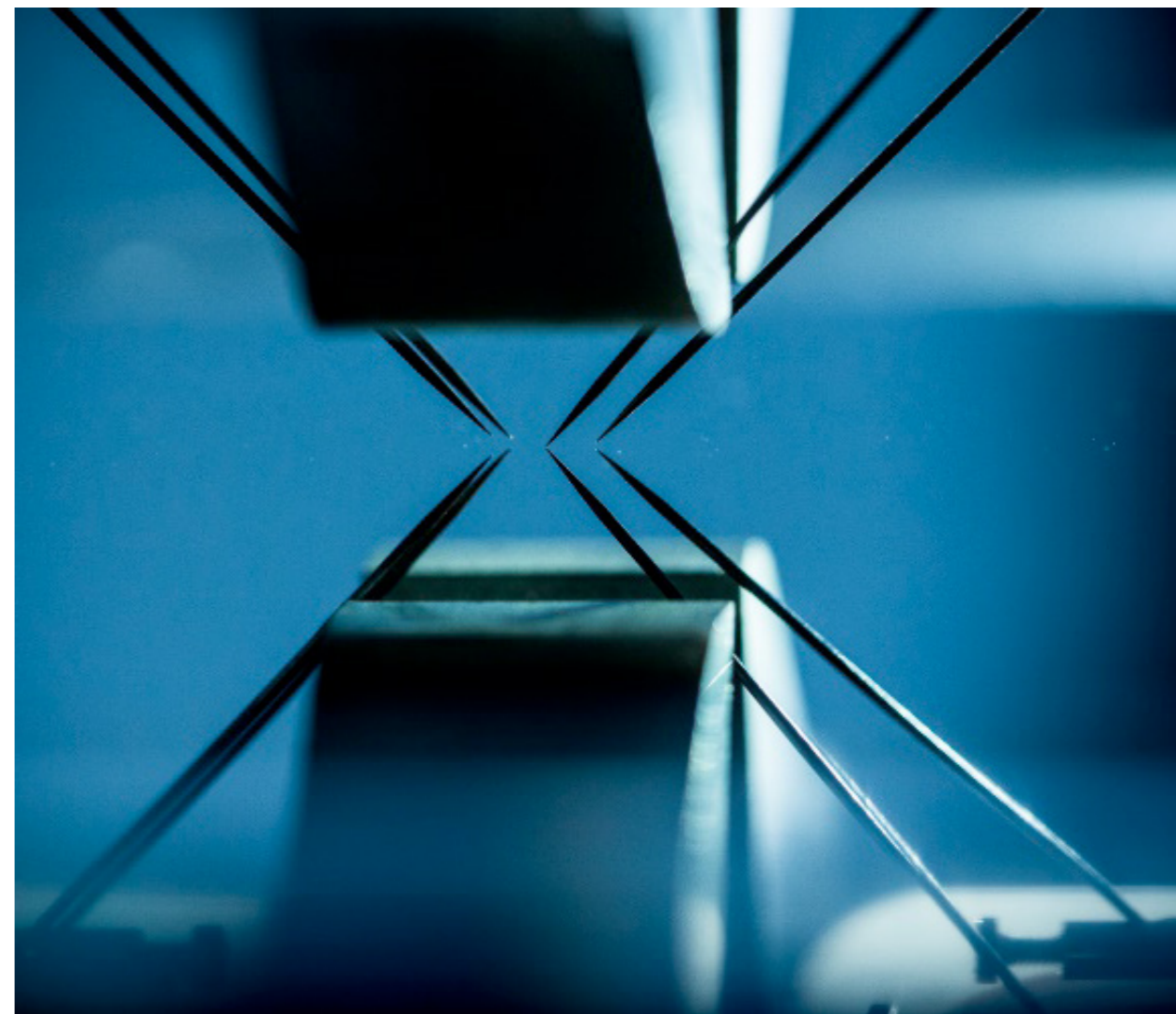
When the sizes of a device or material approach the nanometer scale (transistors in current computers

or smartphones are currently at the 10 nanometer scale) the discrete nature of atoms, which have interatomic distances in the tenths of nanometer, becomes relevant, and materials reveal new physical properties. This opens the opportunity for new science, technology and applications, but also challenges for the further miniaturization of established technologies. This is the new field of nanotechnology.

A WORLD OF MANY CONDENSED MATTER PHASES: FROM LAB TO LIFE

The understanding of equilibrium phases of matter is important for soft matter like liquid crystals, polymers, dendrimers and ionic liquids. Our activity on Soft Matter includes the research on complex fluids and partially ordered systems with application as smart information displays, optoelectronic devices, drug carriers in nanomedicine, “green” chemistry and CO₂ capture systems for environment protection. In our labs we investigate experimentally the physical properties of such systems by means of nuclear magnetic resonance, x-ray diffraction, electro-optical measurements and atomic force microscopy. In these soft-matter systems, the intrinsic mobility of molecules adds a new challenge to the understanding of physical behavior; the theoretical modeling and control of physical properties in envisaged new technological applications.

The understanding of equilibrium phases of matter is also very important for concepts such as emergent phenomena, quasi-particles, or symmetry breaking. New states of matter have fueled the recent activity such as heavy-fermion systems, graphene and other two-dimensional systems, topological insulators. Our theoretical condensed matter physics research is related with low-dimensional systems and materials, spintronics, cold atoms, superconductivity and applications of quantum information in condensed matter systems. The search for new phases of matter and the complex properties of systems far from equilibrium are two of the main current topics of research. We also study non-equilibrium phase



transitions and route to thermalization in strongly interacting systems. In particular, we focus on the dynamics of transitions to topological phases. We also investigate the connection of condensed matter systems with cold atoms in optical lattices and other similarities with other systems, and the interplay of quantum information and traditional condensed matter techniques have allowed significant progress. Recently great effort has been put in systems far from equilibrium imposing new ideas on how complex systems behave.

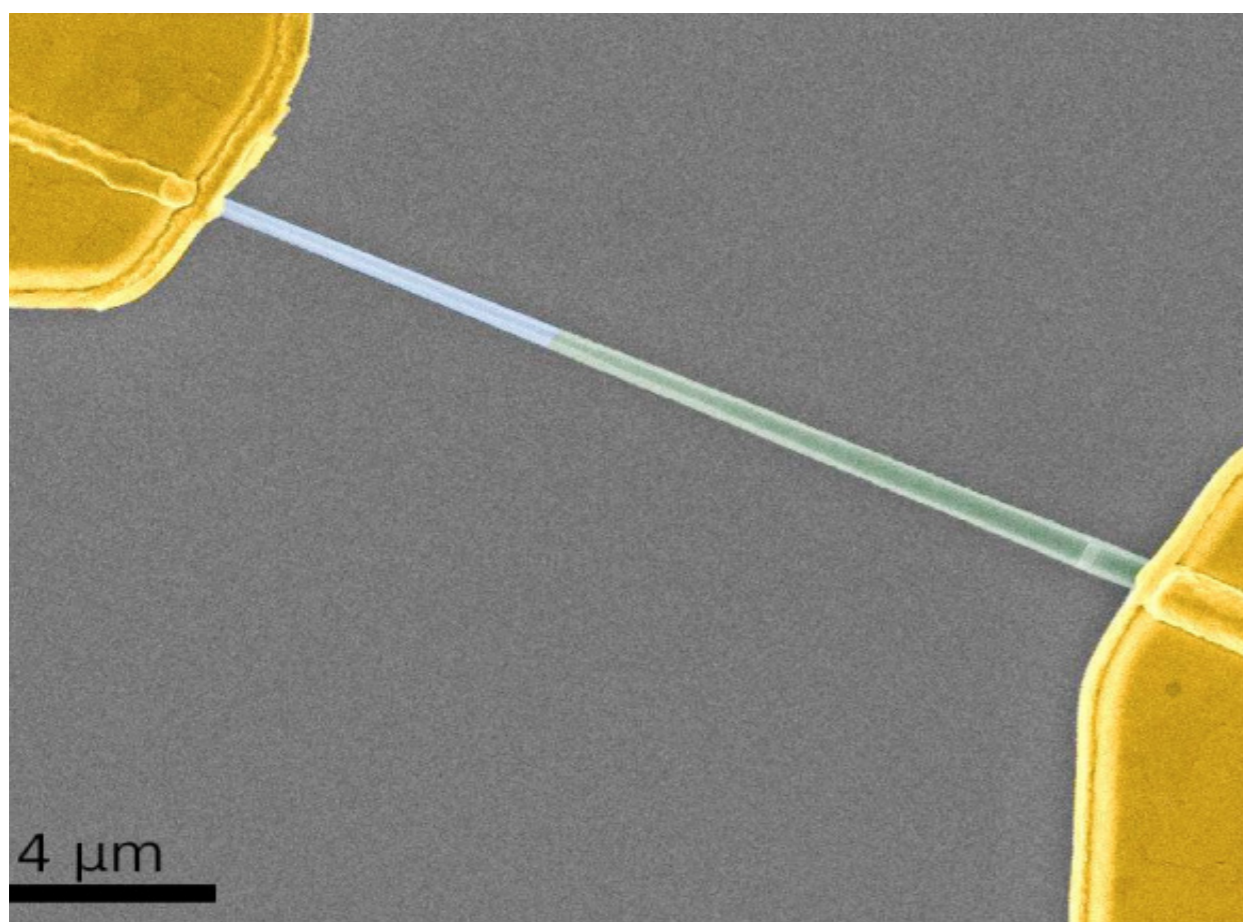
The development of experimental techniques such as thin film deposition, scanning tunneling microscopy (STM) or atomic force microscopy (AFM) allows the manipulation of individual atoms, leading to the engineering of systems at a microscopic level

where the laws of physics are dominated by quantum effects. This manipulation of matter at atomic or molecular levels in scales from 1 nm to typically 100 nm is the realm of nanotechnology. We combine the theoretical physics with state-of-the-art technologies to produce science and innovations at the nano scale. We are motivated by the applications of the fundamental research. One example is the study of biological systems and processes, ultrafiltration membranes, nano and micro structures polymer surfaces using AFM. Another example is the application of magnetoresistive sensors for safety and surface inspection, power electronics, biochips for health, magnetic scanners, among many others, through collaborative projects and contracts for services provided for the international industry.

We work in a clean room level 10, produce thin films with ion beam, sputtering and chemical vapor deposition systems, and define nanostructures by lithography. All of these activities are supported by advanced characterization lab infrastructures. Our students are integrated with the research groups early in their curricular years and gain experience in international teams. Several types of magnetic, semiconducting, insulating and conducting materials are deposited and characterized, to support the activities in micro-electronic devices and photovoltaic cells. In the area of spintronics, the groups have been studying fast spin dynamics in various configurations and using various methods to induce changes in spin orientation, in combination with the experimental

validation in functional devices. The preparation and characterization of low dimensional nanostructures, such as nanowires and semiconductor heterostructures are also made. Ion beams are used for the modification and characterization of such functional materials. Furthermore, nuclear techniques, using radioactive ions as probes, give information on materials properties on a nanoscopic scale.

We combine the theoretical and experimental tools to build smart devices with novel functionalities. These are inspired by the state-of-the-art technologies, which require a multidisciplinary approach to combine concepts of biology, plasmas, nanomedicine, robotics, microfluidics, or nanoelectronics.



FACILITIES

The research is carried out at CeFEMA, INESC-MN, LATR and at IT.

The laboratory facilities include:

Laboratory of Micro and Nanotechnologies of INESC-MN

Laboratory of Nanophysics (at Taguspark campus) of INESC-MN

Laboratory of Liquid Crystals and Condensed Matter (CeFEMA)

Laboratory of Nuclear Magnetic Resonance (CeFEMA)

Laboratory of Atomic Force Microscopy (DF and INESC-MN)

Laboratory of Semiconductor Materials and Energy Conversion (CeFEMA)

Laboratory of Physics and Technology of Semiconductors (CeFEMA)

Ion Beam Laboratory and High Resolution X-ray Diffraction Laboratory (LATR, CTN)

Laboratory for Materials Characterization with Radioactive Nuclear Techniques (ISOLDE-CERN)

TEACHING ACTIVITIES

PhD curricular units:

Advanced Condensed Matter Physics

Advanced Topics in Condensed Matter Physics

Many Particle Systems and Critical Phenomena

Physics of Classical and Quantum Information

Topics in Advanced Magnetism

Topics of Physics of Liquid Crystals

Cond. Matter Physics and Quantum Information

Physics of Semiconductor Nanostructures

Spintronics

Topics of Experimental Condensed Matter Physics

Advanced Characterisation of Functional Materials

Microfluidics

Complements of Microtechnologies

MSc curricular units:

Nanotechnologies and Nanoelectronics

Micro and Nanofabrication Techniques

Condensed Matter Physics

Physics of Liquid Crystals

Complements of Condensed Matter Physics

Physics and Technology of Magnetic Materials

Physics and Technology of Semiconductors

Characterization Methods in Solid State Physics

Condensed Matter Physics Laboratory

Introduction to Spintronics

NMR of Partially Ordered Systems

Topics in Condensed Matter Physics

MEMBERS

Pedro Miguel Félix Brogueira
Full Professor (Area Coordinator)

José Luís Martins
Full Professor

Pedro Domingos Santos do Sacramento
Associate Professor with “Agregação”

Pedro José Oliveira Sebastião
Associate Professor with “Agregação”

Reinhard Horst Schwarz
Associate Professor

Susana Isabel Pinheiro Cardoso de Freitas
Associate Professor

Ana Maria Guerreiro Martins
Assistant Professor with “Agregação”

Carlos Manuel dos Santos Rodrigues da Cruz
Assistant Professor with “Agregação”

João Luis Maia Figueirinhas
Assistant Professor with “Agregação”

Luís Viseu Melo
Assistant Professor with “Agregação”

Ana Maria Heleno Branquinho de Amaral
Assistant Professor

António Mário Pereira Ferraz
Assistant Professor

Pedro José Gonçalves Ribeiro
Assistant Professor

Umesh Vinaica Mardolcar
Assistant Professor

Vítor Rocha Vieira
Invited Full Professor

António Jorge Duarte de Castro Silvestre
Invited Associate Professor

Ana Neves Vieira da Silva
Invited Assistant Professor

Bruno Miguel Santos Mera
Invited Assistant Professor

Diana Cristina Pinto Leitão
Invited Assistant Professor

Helena Cristina Ramos Jerónimo Dias Alves
Invited Assistant Professor

Mustafa Erkovan
Invited Assistant Professor

Vânia Silvério
Invited Assistant Professor

WEBSITE

<https://fenix.tecnico.ulisboa.pt/areacentifica/df/fincn>

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INTERDISCIPLINARY PHYSICS



The Keahole Solar Power in Hawaii. Image: Xklaim

The scientific area of Interdisciplinary Physics studies the behaviour of complex systems, microscopic and macroscopic. The fields of study represented in the Department of Physics are: Dynamical Systems, Mathematical Physics, Biophysics, Biophysics Applied Astrophysics, Globe Physics and Geophysics, and Physics of Energy. To respond to a broad spectrum of the challenges of modern society, we specialized in the following areas:

Non-linear dynamics of microscopic and macroscopic physical systems. Celestial mechanics, theory of complexity and chaos, astrophysics and mathematical physics;

Dynamics, evolution and mechanisms of biological/biophysical systems. Multidisciplinary applications of biophysics;

Study of geophysical processes such as earthquakes, volcanic eruptions and the Earth's magnetic field;

Study and development of sustainable energy systems, from generation through renewable resources to the implementation of energy efficiency.

AREAS CURRENTLY IN FOCUS

Dynamical systems, mathematical physics and biophysics (Prof. Rui Dilão).	Technologies for renewable energies (Prof. Filipe Mendes).
Biophysics (Prof. Teresa Pinheiro).	High energy dispersion reactions. Elasticity in special relativity with applications in astrophysics (Prof. João Carlos Fernandes).
Geophysics (Prof. João Fonseca, Prof. Manuela Mendes).	

RESEARCH UNITS

CERENA, Center for Natural Resources and the Environment (http://cerena.ist.utl.pt)	GDNL, Non-Linear Dynamics Group (http://sd.tecnico.ulisboa.pt/NonLinear_Dynamics_Group/GDNL.html)
CTN, Campus Tecnológico e Nuclear (http://www.ctn.pt)	IN+, Centre for Innovation, Technology and Policy Research (http://in3.dem.ist.utl.pt)

TEACHING ACTIVITIES

MSc curricular units:	Solar Thermal Energy
Dynamical Systems	Energy Technologies
Biophysics	Photovoltaic Solar Energy
Earth Physics	Energy Services

MEMBERS

Rui Dilão <i>Assistant Professor with “Agregação” (Area Coordinator)</i>	Filipe Mendes <i>Assistant Professor</i>
João Fonseca <i>Assistant Professor</i>	Manuela Mendes <i>Assistant Professor</i>
João Carlos Fernandes <i>Assistant Professor</i>	

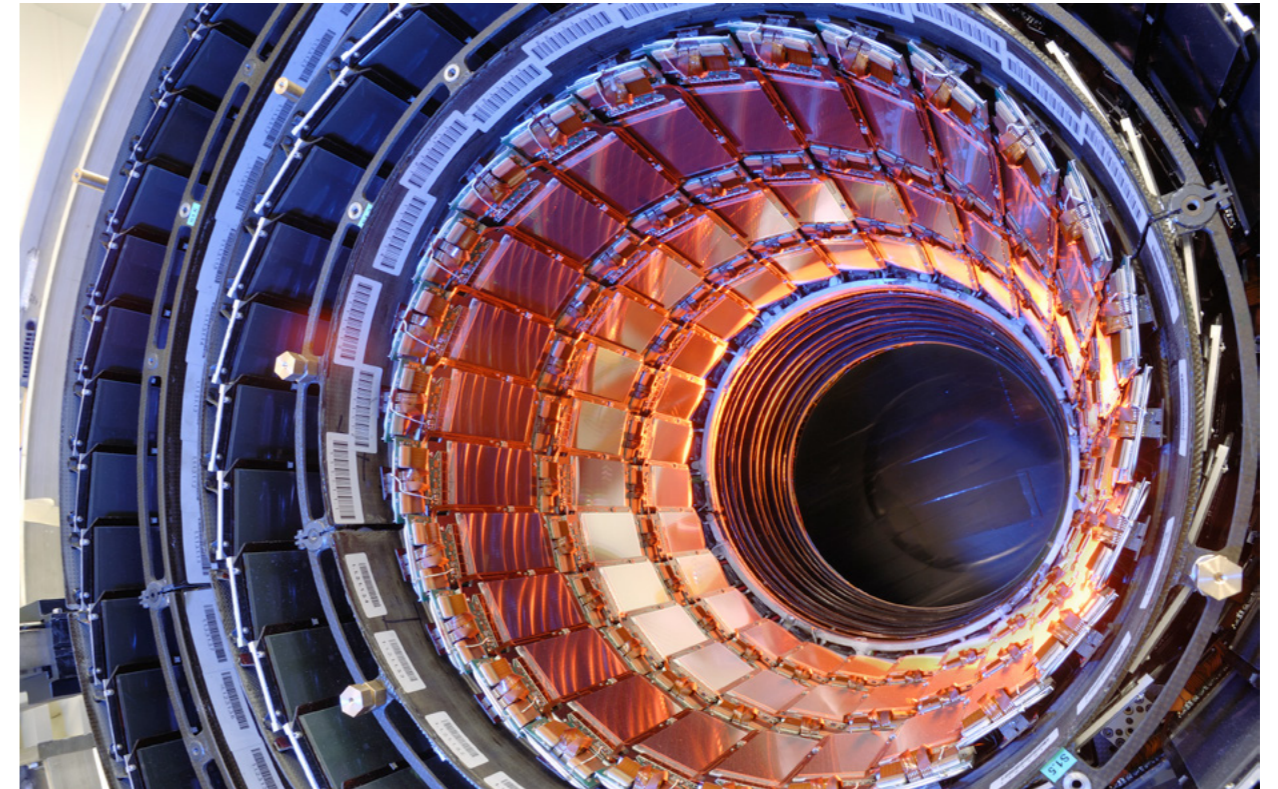
WEBSITE

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PARTICLE AND NUCLEAR PHYSICS



*The CMS inner tracker barrel inside the LHC.
Image: Maximilien Brice/CERN.*

Particle and Nuclear Physics (PNP) is a major area of scientific research at the Department of Physics (DF) at IST. Research and PhD programs/projects are done in collaboration with prominent international institutes, such as: CERN, the Pierre Auger Observatory, the SNOLAB, the Jefferson Lab, important universities of the Iberian peninsula, and other big universities of Europe/USA/Japan/India.

Internationalization is also reflected in the fact that researchers and professors working in PNP also include many people from other nationalities. All researchers and professors belong to one of the Research Units associated with the DF and receiving funding support from FCT—Ministry of Science and from the EU. At IST

the Research Units associated to the DF in the area of PNP include LIP, CFTP, C2TN and a small part of the theory group at CeFEMA. The experimental particle and nuclear physics and related technologies are developed at LIP, that participates in the big experiments at international research infra-structures like ATLAS and CMS at the Large Hadron Collider (LHC) at CERN, the Pierre Auger Observatory in Argentina, the Sudbury Neutrino Observatory (SNO) in Canada and a number of other experiments (COMPASS, LUX, etc). Researchers from LIP were involved in the experiments that led to the Nobel Prizes in Physics in 2013 (Higgs boson discovery) and 2015 (Neutrino oscillations). Theoretical physics projects are also developed at LIP, related to

phenomenology in ultra high energies and high densities of matter — including the quark-gluon plasma, and to theoretical nuclear physics.

On the theoretical side most of the research in theoretical particle physics in Portugal is done at CFTP. Topics are related to the frontiers being pursued in the experimental side, Higgs Physics, Neutrino Physics, Dark Matter, just to name a few. This research is highly internationalized and CERN plays also a major role as a privileged place for the exchange of these ideas.

The scientific works are published in the major international journals for the area, such as: Physics Letters, Physical Review, Astroparticle Physics Journal, JHEP, etc.

Studies in Particle and Nuclear Physics can be carried out either at the level of a Master of Science (2nd Bologna cycle), or a PhD (3rd Bologna cycle). The usual way to initiate a study is to make first contact directly

with one of our researchers/professors.

In 2018 and 2019, the members of the area contributed to the preparation of the European Strategy on Particle Physics, at different levels, approved in 2020. This was the result of a call for contributions from the CERN Council, following a bottom-up approach in the preparation of the strategy. Besides specific contributions, the members also contributed to the general document stating the positions of the Portuguese community of particle physics (experimental and theoretical).

In late 2019 LIP, IST, the University of Coimbra and Grupo Hospitalar Instituto Português de Oncologia Francisco Gentil created the ProtoTera association to install a cancer treatment facility at IST/CTN, based on proton therapy. This facility includes a research room that opens opportunities for research and studies in applications of particle and nuclear physics.

TEACHING ACTIVITIES

MSc curricular units:

Cosmic Rays Laboratory	Material Science for the Nuclear
Nuclear Reactors	Radiological Protection and Dosimetry
Digital Logic Design and Control	Nuclear and Particle Physics Technology
Particle Physics	Radiological Safety and Protection
Experimental Methods in Particle Physics	Nuclear Energy
Physics of Nuclear Reactors	Simulation Methods for Particle Detectors
Group Theory in Physics	Nuclear Fission and Fusion Technologies
Quantum Field Theory	Standard Model and New Physics
Hadron Physics and Quantum Chromodynamics	Nuclear Instrumentation Techniques
Radiation Physics	Topics in Particle Physics, Astrophysics and Cosmology
Material Science for Nuclear Technologies	Nuclear Physics
Radiation Physics and Technology	

The PhD Programs in Physics and in Engineering Physics and Technology of the Department of Physics are designed to provide advanced knowledge and research capabilities in at least one of the scientific areas in which the department is organized. In the area of Particle and Nuclear Physics students can work in national and

international scientific centres and laboratories, for instance, the reference laboratory for Particle Physics, the European Organization for Nuclear Research (CERN). They will also profit from the many international collaborations that exist in this very competitive area to start a successful career.

PhD curricular units:

Advanced Experimental Methods in Particle Physics I	Particle Physics Techniques
Design and Simulation of Radiation Detectors	Advanced Topics in Particle and Astroparticle Physics II
Advanced Experimental Methods in Particle Physics II	Project on Data Acquisition and Control in Detectors
Nuclear Physics Methods in Science and Technology	Astroparticles
Advanced Topics in Particle and Astroparticle Physics I	Topics in Particle Physics
	Computational Methods in Radiation Technology

NATIONAL/INTERNATIONAL PROTOCOLS

IDPASC international network. Includes:

CERN, CBPF, Doctoral School in Physics of the University of Padua, EGO, IFCA, MAP_Fis, U. Algarve, U. Bari, U. Coimbra, U. Évora, U. Genova, U. Granada, U. Lisboa, U. Nova Gorica, UL-IST, U. Padova-STMS, U. Paris VI-Pierre et Marie Curie, U. Paris VII-Paris Diderot, U. Porto, U. Santiago Compostela, U. Savoie, U. Siena, U. Trento, U. Udine, U. Valencia,

U. Salento, SPRACE-UNESP/UFABC, Doctoral School PHENIICS-Université Paris-Saclay.

IDPASC-Portugal PhD programme. Includes:

Universidade de Lisboa, Universidade de Coimbra, Universidade do Porto, Universidade do Minho, Universidade de Évora, Faculdade de Ciências da Universidade de Lisboa, Instituto Superior Técnico.

MEMBERS

Jorge Manuel Rodrigues Crispim Romão
Full Professor

Mário João Martins Pimenta
Full Professor (Area Coordinator)

Maria Teresa Haderer de la Peña Stadler
Full Professor (Joint appointment with the Dept. of Nuclear Sciences and Engineering)

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Associate Professor with "Agregação"

João Paulo Ferreira da Silva
Associate Professor with "Agregação"

Pedro José de Almeida Bicudo,
Associate Professor with "Agregação"

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Sérgio Eduardo de Campos Costa Ramos
Assistant Professor with "Agregação"

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Assistant Professor

Filipe Rafael Joaquim
Assistant Professor

Patrícia Conde Muíño
Assistant Professor

Pedro Jorge dos Santos Assis
Assistant Professor

Samuel Rodrigues Martins Eleutério
Assistant Professor

Alessandro de Angelis
Invited Full Professor

Enrico Maglione,
Invited Associate Professor

Luís Manuel Balio Lavoura,
Invited Associate Professor

Maria Margarida Nesbitt Rebelo da Silva
Invited Associate Professor

Ricardo Jorge González Felipe
Invited Associate Professor

Alfred Stadler
Invited Assistant Professor

André David Tinoco Mendes
Invited Assistant Professor

Bernardo António Neto Gomes Baptista Tomé
Invited Assistant Professor

Elmar Biernat
Invited Assistant Professor

Gernot Eichmann
Invited Assistant Professor

Ivo Varzielas
Invited Assistant Professor

Joaquim Inácio da Silva Marcos
Invited Assistant Professor

Liliana Marisa Cunha Apolinário
Invited Assistant Professor

Michele Gallinaro
Invited Assistant Professor

Miguel Rubén Nebot Gómez
Invited Assistant Professor

Nuno Miguel Ribeiro Cardoso
Invited Assistant Professor

Pietro Faccioli
Invited Assistant Professor

Ruben Maurício da Silva Conceição
Invited Assistant Professor

RESEARCH UNITS

C2TN – Centre for nuclear sciences and technologies
(c2tn.tecnico.ulisboa.pt).

CeFEMA – Center of Physics and Engineering
of Advanced Materials

CFTP – Centre for theoretical particle physics
(cftp.tecnico.ulisboa.pt).

LIP – Laboratory of instrumentation and
experimental particle physics (www.lip.pt).

WEBSITE

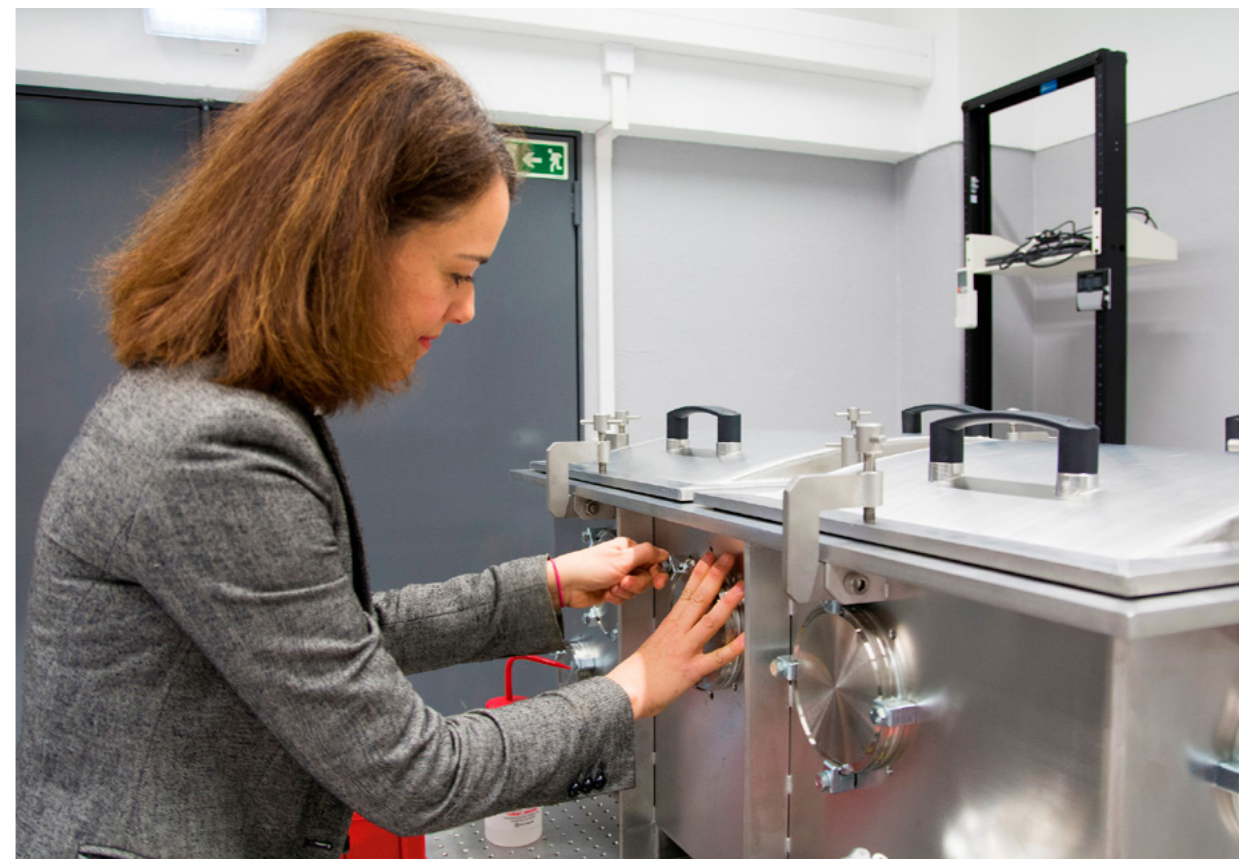
<https://fenix.tecnico.ulisboa.pt/areacentifica/df/fjfn>

CONTACT

Area coordinator: +351 210493600

Secretariat: +351 218419092

PLASMAS LASERS AND NUCLEAR FUSION



Prof. Marta Fajardo at VoXEL (Volumetric medical X-ray imaging at extremely low dose). Image: IPFN

The faculty members of The Scientific Area of Plasmas, Lasers and Nuclear Fusion of the Physics Department of Instituto Superior Técnico (IST) are actively engaged in education, research and outreach programs in a wide range of topics covered in that area, both from a fundamental and technological/engineering perspective. All these activities leverage on long standing international partnerships and research contracts with leading institutions in our fields of expertise.

Besides collaborating in the undergraduate Physics course for all 1st and 2nd cycle degrees of IST, our faculty members are responsible for several courses in the In-

tegrated Master in Technological Physics Engineering, in our topics of expertise. We are also strongly involved in the PhD degrees of Physics and Technological Physics Engineering, in the framework of Advanced Program in Plasma Science and Engineering (APPLAuSE 2020). Several of our faculty members were awarded the mention “Excellent Teacher” in 2018 (Marta Fajardo and Jorge Vieira, in scholar year 2016/2017) and in 2019 (Gonçalo Figueira and Luís L. Alves, in scholar year 2017/2018).

The research of the faculty members is developed at the Institute of Plasmas and Nuclear Fusion, an Associated Laboratory ranked “Excellent” in the 2019 evaluation,

coordinated by the Fundação para a Ciência e a Tecnologia. Our research spans low-temperature plasma science and engineering, plasma science and engineering of magnetic fusion, plasma physics at high energy density, space and astrophysical plasmas, and basic plasma science, with a broad methodological approach ranging from theory and simulations to experiments, from fundamental science to engineering.

The vibrant research programmes of our faculty members have led to 90+ publications in speciality journals in Plasma Physics, Optics and Nuclear Fusion, several in high-impact physics journals (e.g. 1 Nature Photonics, 1 Nature Physics, 1 Physical Review Letters, 1 The Astrophysical Journal Letters, 2 The Astrophysical Journal, 5 Scientific Reports), and to several high profile research grants at the national and at the international level.

Our distinguished faculty member, Professor Luís Oliveira e Silva, was elected fellow of the European Academy of Sciences (EurASc) in November 2019, becoming the first Portuguese to join the Physics division of this prestigious academy. And in December 2019, Professor Luís Silva was elected correspondent member of the Lisbon Academy of Sciences.

In 2018 Professor João Pedro Bizarro was promoted to Associate Professor, Doctors Bruno Gonçalves and Carlos

Silva were promoted to Principal Researchers, Doctor Rui Coelho was recruited as Assistant Researcher, and Professor Artur Malaquias was appointed for a three-year term as ITER Scientist Fellow. In 2019, Professor Jorge Vieira was recruited as Assistant Professor, and Professor Hugo Terças was hired as Assistant Researcher in the Individual call to Scientific Employment Stimulus 2018.

In the period 2018–2019, we have supervised 37 MSc dissertations. In the same period, 26 of our PhD students have defended their theses. Several of them have received prizes at conferences, delivered invited talks at international conferences, and secured post-doctoral positions in leading institutions worldwide.

The faculty members are also engaged in outreach programs targeted at high school students, undergraduate students, and the general public. Examples of these activities include the Ciência Viva Summer Training, the PlasmaSurf Summer School and the Athens Programme courses.

The website of the Scientific Area (<http://plasmas.tecnico.ulisboa.pt>) is constantly updated to showcase the key achievements of the faculty members, and provide information about our educational activities, research and opportunities.

TEACHING ACTIVITIES

MSc curricular units:

Advanced Plasma Physics
 Advanced Topics in Computational Physics
 Data Acquisition Systems
 Diagnostic and Measurement Techniques
 Entrepreneurship, Innovation and Science Management
 Low Temperature Plasmas
 Nuclear Fusion
 Optics and Lasers
 Plasma Physics and Technology
 Plasma Technologies for Materials Processing
 Real Time Control

PhD curricular units:

Fundamentals of Plasma Physics, Nuclear Fusion and Lasers
 Diagnostic Methods for Plasmas
 Advanced Topics in Plasma Physics, Nuclear Fusion and Lasers
 Advanced Computing in Physics and Engineering

MEMBERS

Luís Paulo da Mota Capitão Lemos Alves
Full Professor (Area coordinator)

Luís Miguel de Oliveira e Silva
Full Professor

Horácio João Matos Fernandes
Associate Professor with “Agregação”

João Pedro Saraiva Bizarro
Associate Professor with “Agregação”

Vasco António Dinis Leitão Guerra
Associate Professor with “Agregação”

Bruno Miguel Soares Gonçalves
Principal Researcher with “Habilitação”

Carlos Alberto Nogueira Garcia Silva
Principal Researcher with “Habilitação”

Artur Jorge Louzeiro Malaquias
Assistant Professor

Bernardo Brotas de Carvalho
Assistant Professor

David Pacheco Resendes
Assistant Professor

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Gonçalo Nuno Marmelo Foito Figueira
Assistant Professor

João Alberto dos Santos Mendanha Dias
Assistant Professor

Jorge Miguel Ramos Domingues Ferreira Vieira
Assistant Professor

Mário José Gonçalves Pinheiro
Assistant Professor

Marta Leitão Mota Fajardo
Assistant Professor

Rui Miguel Dias Alves Coelho
Assistant Researcher

Nuno Filipe Gomes Loureiro
Invited Associate Professor (in 2018)

Hugo Fernando Santos Terças
Invited Assistant Professor

Mário António Prazeres Lino da Silva
Invited Assistant Professor



SCIENTIFIC ACTIVITIES

NOBEL AND IST DISTINGUISHED LECTURES



Professor Gérard Mourou, winner of the Nobel Prize in Physics 2018, gave a colloquium at Técnico on 24th April, 2019.

December 15, 2018
 IST Distinguished Lecture
Spin electronics: From basic concepts to applications towards a greener electronics
 Bernard Diény
 SPINTEC, Université Grenoble Alpes
 CEA / CNRS, France

April 24, 2019
 Nobel Lecture and DF Colloquium
Passion Extreme Light
 Gérard Mourou
 (Nobel Laureate in Physics in 2018)
 École Polytechnique, Palaiseau, France

September 25, 2019
 IST Distinguished Lecture and DF Colloquium
Unveiling the mysteries of unstable matter
 Filomena Nunes
 Department of Physics and Astronomy,
 National Superconducting Cyclotron Lab,
 Michigan State University, USA

DF COLLOQUIA

February 28, 2018
Quantum disruption
José Ignacio Latorre
University of Barcelona, Spain

March 7, 2018
“Interdisciplinary Physics” Panel:
Mohamed Chaker
INRS–Énergie et Matériaux, Montréal, Canada
Jacques Bélair
Département de mathématiques et de statistique,
Université de Montréal, Canada
George Helffrich
Tokyo Institute of Technology,
Earth-Life Science Institute, Japan

March 14, 2018
ITER: Challenges and the Portuguese Participation
Bruno Gonçalves
IPFN and Physics Department
Instituto Superior Técnico

March 21, 2018
Linking visual motion to locomotion
Eugenia Chiappe
Lab. of Sensorimotor Integration,
Champalimaud Centre for the Unknown
Lisbon

April 4, 2018
*The discrete charm of scale invariance
in nuclear and atomic physics*
Ubirajara van Kolck
IPN, Orsay, France
and University of Arizona, USA

April 11, 2018
Extreme laser-matter interactions
Marija Vranic
GOLP/IPFN, Instituto Superior Técnico

April 18, 2018
Accelerators and fabrication of new materials
Katharina Lorenz
DECN, Instituto Superior Técnico

May 2, 2018
*Data mining for decision-making:
from disease forecasting to political arguments*
Joana Gonçalves de Sá
DF, Instituto Superior Técnico

May 9, 2018
Cutting core and edge physics in tokamak plasmas
Carlos Silva and Rui Coelho
IPFN, Instituto Superior Técnico

October 3, 2018
*Opening CO₂ plasmas: from solar fuels
to oxygen production on Mars*
Vasco Guerra
IPFN and DF, Instituto Superior Técnico

October 10, 2018
Sailing to new physics
Igor Ivanov
CFTP, Instituto Superior Técnico

October 17, 2018
*Probing the nature of gravity and extreme matter
with gravitational-wave observations*
Alessandra Buonanno
Director of the Max Planck Institute
for Gravitational Physics, Potsdam, Germany

October 24, 2018
*Extreme science with extreme lasers:
the Nobel Prize in Physics 2018*
Gonçalo Figueira and Luís Oliveira e Silva
GOLP/IPFN and DF, Instituto Superior Técnico

November 7, 2018
“P mc²” – Physics in medicine of cancer care
João Seco
German Cancer Research Center – DKFZ
and Dep. Physics and Astronomy,
University of Heidelberg, Germany

November 21, 2018
Testing the Kerr hypothesis
Carlos Herdeiro
CENTRA and DF, Instituto Superior Técnico

December 5, 2018
*The highest-energy particles in nature: what they
tell us about astrophysics and particle physics*
Alan Watson
University of Leeds, UK

February 20, 2019
Shine a light! When matter shatters
Tetyana Galatyuk
Technische Universität Darmstadt, Institut für
Kernphysik (IKP) and GSI, Germany

March 6, 2019
The Higgs boson: what do we know about it?
Patrícia Conde-Muñoz
LIP and DF, Instituto Superior Técnico

March 20, 2019
Skyrmion lattices in quantum Hall ferromagnets
Doucot Benoit
LPTHE, CNRS and Sorbonne Université
Paris, France

April 3, 2019
*How to Invest like a physicist:
the quantitative approach to finance*
Fábio Rocha
Strategist, Blueshift Asset Management

April 10, 2019
Alfvén waves: rippling along magnetic-field lines
Paulo Rodrigues
IPFN, Instituto Superior Técnico

April 24, 2019
Nobel Lecture “Passion Extreme Light”
Gérard Mourou
(Nobel Laureate in Physics in 2018)
École Polytechnique, Palaiseau, France

May 8, 2019
*Thermodynamics of growing systems:
organisms and economies*
Tiago Domingos
MARATEC, LARSYS – Lab. Robotics
and Engineering Systems

September 25, 2019
Unveiling the mysteries of unstable matter
Filomena Nunes
Department of Physics and Astronomy
National Superconducting Cyclotron Lab
Michigan State University, USA

October 9, 2019
*Plasma based accelerators and light sources:
from compact to topological*
Jorge Vieira
IPFN and DF, Instituto Superior Técnico

October 16, 2019
*Nobel Prize in physics 2019 and tests
of general relativity with cosmology*
Pedro Gil Ferreira
Physics Department
University of Oxford, UK

October 30, 2019
Quantum matter in and out of equilibrium
Pedro Ribeiro
CeFEMA and DF, Instituto Superior Técnico

November 13, 2019
*Proton therapy: from the benefits to the challenges
for clinical implementation*
Isabel Almeida
C2TN, Instituto Superior Técnico

November 27, 2019
*From strongly correlated QCD
to asymptotically safe quantum gravity*
Jan Pawłowski
Institute for Theoretical Physics
University of Heidelberg, Germany

December 11, 2019
Rare signals from big data
Nuno Leonardo
LIP and DF, Instituto Superior Técnico

RESEARCH SEMINARS

- January 11, 2018
The chaotic nature of AdS: an attempt at predicting the future
Jorge Lopes
CENTRA
[CENTRA Seminar]
- January 18, 2018
Scalar field dark matter with spontaneous symmetry breaking and the 3.5 keV line
Catarina Cosme
Dep. Física e Astronomia
Universidade do Porto
[CFTP Seminar]
- January 25, 2018
Evolution of magnetic field of neutron stars
Sergei Popov
Sternberg Astronomical Institute
[CENTRA Seminar]
- February 1, 2018
Primordial fluctuations in Loop Quantum Cosmology
Mercedes Martin-Benito
IAstro
[CENTRA Seminar]
- February 8, 2018
The infrared instrument of the Extremely Large Telescope
Paulo J. V. Garcia
FEUP and CENTRA
[CENTRA Seminar]
- February 15, 2018
The Higgs, field theory, and what particles we can actually observe at the LHC
Axel Maas
University of Graz
[CFTP Seminar]
- February 22, 2018
Gravitational wave signatures from string theory?
Bert Vernocke
KU Leuven, Belgium
[CENTRA Seminar]
- March 2, 2018
Exotic compact objects and how to quench their ergoregion instability
Elisa Maggio
Sheffield University, UK
[CENTRA Seminar]
- March 5, 2018
Enabling a visual based exploration of the Gaia data products and other big data archives
André Moitinho,
CENTRA and University of Lisboa
[CENTRA Seminar]
- March 8, 2018
2017 Nobel Prize in Physics for a discovery that shook the world
Francisco Lobo
IAstro and FCUL, Lisboa
[LIP Seminar]
- March 15, 2018
Black-hole binaries in Einstein-dilaton Gauss-Bonnet gravity
Helvi Witek,
Kings College London, UK
[CENTRA Seminar]
- March 22, 2018
Effective methods for advanced PCB routing
Miguel Ferreira
LIP
[LIP Seminar]
- April 5, 2018
Black hole mergers in the extreme mass ratio limit
Marina Martínez
KU Leuven, Belgium
[CENTRA Seminar]
- April 12, 2018
Gravitational-wave signals from precessing binary black holes: modelling & measurement
Christopher Moore
CENTRA
[CENTRA Seminar]
- April 13, 2018
Black holes and revelations
José Pedro Mimoso
Dep. Física da Faculdade de Ciências
Universidade de Lisboa & IA Lisboa
[LIP Seminar]
- April 16, 2018
Gravitational waves: a new window on the universe
Tomás Reis
University of Geneva, Switzerland
[CENTRA Seminar]
- April 19, 2018
Gravitational waves and primordial black hole dark matter
Martti Raidal
National Institute of Chemical Physics and Biophysics, Tallinn, Estonia
[CENTRA Seminar]
- April 30, 2018
z boson pair production at the LHC at NNLO in QCD
Joao Pires
CFTP, Instituto Superior Técnico
[CFTP Seminar]
- April 30, 2018
Sending lasers to space. What could go wrong?
Bruno Couto
CENTRA/SIM, Lisboa
[CENTRA Seminar]
- May 3, 2018
Holographic abrikosov vortex lattices
Christiana Pantelidou
Durham University, UK
[CENTRA Seminar]
- May 10, 2018
CP of order 4 and its consequences
Igor Ivanov
CFTP, Instituto Superior Técnico
[CFTP Seminar]
- May 10, 2018
How light is gravity?
Claudia de Rham
Imperial College, London, UK
[CENTRA Seminar]
- May 17, 2018
General relativity solutions in modified gravity
Hayato Motohashi
Yukawa Institute for Theoretical Physics,
Kyoto University, Japan
[CENTRA Seminar]
- May 18, 2018
Test fields cannot destroy extremal black holes
Rodrigo Vicente
CENTRA
[CENTRA Seminar]
- May 28, 2018
How to simulate the atmosphere of different planets using (almost) similar numerical tools
Gabriella Gilli
IAstro
[CENTRA Seminar]
- May 29, 2018
Astroparticle physics with neutrinos at the South Pole
Juan Pablo Yanez
University of Alberta, Canada
[LIP Seminar]
- May 10, 2018
Multiplicity fluctuations near the QCD critical point
Maurício Hippert
UFRJ, Rio de Janeiro, Brazil
[LIP Seminar]
- May 17, 2018
General relativity solutions in modified gravity
Hayato Motohashi
Yukawa Institute for Theoretical Physics,
Kyoto University, Japan
[CENTRA Seminar]
- May 18, 2018
Test fields cannot destroy extremal black holes
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Astroparticle physics with neutrinos at the South Pole
Juan Pablo Yanez
University of Alberta, Canada
[LIP Seminar]

- June 4, 2018
The manufacture of mice: Where organ engineering must go
Edward Leonard
Columbia University, New York, USA
[CeFEMA Seminar]
- June 7, 2018
Gravitational waves and the nature of relativistic compact objects
Chris Van Den Broeck
NIKHEF, The Netherlands
[CENTRA Seminar]
- June 11, 2018
Mesons and baryons in light front quantization
James Vary
Iowa State University, USA
[CFTP Seminar]
- June 14, 2018
Revisiting black-hole perturbation theory: the hyperboloidal slice approach
Rodrigo Panosso Macedo
Queen Mary London, UK
[CENTRA Seminar]
- June 19, 2018
Neutrino CP violation in the minimal seesaw with flavor symmetry
Morimitsu Tanimoto,
Niigata University, Japan
[CFTP Seminar]
- The dark Universe studied from deep underground: Exploring the low-mass frontier*
Florian Reindl
Technische Universität Wien, Austria
[LIP Seminar]
- June 20, 2018
Imaging black holes through AdS/CFT
Keiju Murata
Univ. Osaka, Japan
[CENTRA Seminar]
- The SHiP experiment proposal at CERN*
Giovanni de Lellis
University of Naples Federico II, Italy
[LIP Seminar]
- June 21, 2018
Strong gravity and fundamental physics: from no hair theorems to hairy black holes
Thomas Sotiriou
University of Nottingham, UK
[CENTRA Seminar]
- June 27, 2018
DUNE: The Deep Underground Neutrino Experiment
Ed Blucher
University of Chicago, USA
[LIP Seminar]
- June 28, 2018
Perturbations of the asymptotic region of the Schwarzschild-de Sitter spacetime
Edgar Gasperin
CENTRA
[CENTRA Seminar]
- July 5, 2018
The self-force problem: Towards EMRI waveforms
Anna Heffernan
University College Dublin, Ireland
[CENTRA Seminar]
- July 12, 2018
Extended I-Love relations for slowly rotating neutron stars
Stephen Green
Max Planck Institute for Gravitational Physics, Potsdam, Germany
[CENTRA Seminar]
- July 19, 2018
Gravity in higher dimensions: Pure Lovelock gravity
Naresh Dadhich
IUCAA, Pune, India
[CENTRA Seminar]
- July 26, 2018
Muography: from dreams to reality
Cristina Carloganu
LPC Clermont Ferrand/IN2P3/
CNRS/UBP, France
[LIP Seminar]
- July 30, 2018
Hydrodynamic rotating black holes: superradiance, geodesic motion and quasi-normal modes
Silke Weinfurter
University of Nottingham, UK
[CENTRA Seminar]
- September 13, 2018
From modelling to inference: order reduction and deep learning in gravitational-wave astronomy
Alvin Chua
JPL, Pasadena CA., USA
[CENTRA Seminar]
- September 20, 2018
Type II supernovae in low-luminosity host galaxies
Claudia Gutierrez
University of Southampton, UK
[CENTRA Seminar]
- September 21, 2018
Right handed neutrinos in flavor anomalies
Lorenzo Ubaldi
SISSA, Trieste, Italy
[CFTP Seminar]
- September 27, 2018
Blast of light from axions
Taishi Ikeda
CENTRA
[CENTRA Seminar]
- October 4, 2018
Self-consistent prediction methods for the phase space of dark matter: from galactic dynamics to phenomenology
Thomas Lacroix
University Paris-Est, France
[CENTRA Seminar]
- October 8, 2018
Unipolar photonics: cross-gap light emission in GaN/AlN and InGaAs/AlAs RTDs at room temperature
Elliot R. Brown
Wright State University
[CENTRA Seminar]
- October 11, 2018
A simple test for the stability of a black hole
Masashi Kimura
CENTRA
[CENTRA Seminar]
- NNLO QCD predictions for inclusive jet production at the LHC*
João Pires
CFTP, Instituto Superior Técnico
[LIP Seminar]
- October 16, 2018
Lepton masses and mixing from modular S4 symmetry
João Penedo
SISSA, Trieste, Italy
[CFTP Seminar]
- October 22, 2018
Indiana Jones and where to find relic galaxies
Fernando Buitrago Alonso
IAstro
[CENTRA Seminar]
- October 25, 2018
21st century astrometry: from ESA/Gaia and beyond
Alberto Krone Martins
CENTRA and FCUL, Lisboa
[CENTRA Seminar]
- October 30, 2018
Black holes and wormholes in semiclassical gravity
Sergey Solodukhin
University of Tours, France
[CENTRA Seminar]
- Flavourful axion phenomenology*
Fredrik Björkeröth,
LNF (Frascati), INFN, Italy
[CFTP Seminar]
- November 5, 2018
No-go theorems for ekpyrosis from ten-dimensional supergravity
Kunihito Uzawa
Kwansei Gakuin University, Japan
[CENTRA Seminar]
- Neutron stars: recent achievements and future prospects*
Violetta Sagun
CENTRA
[CENTRA Seminar]
- November 8, 2018
Biorefineries: fuel oriented or product oriented
Anton Friedl
Vienna University of Technology,
Institute of Chemical Engineering, Austria
[CeFEMA Seminar]
- A first-order secular theory for the post-Newtonian two-body problem with spin: the restricted case*
Sante Carloni
CENTRA
[CENTRA Seminar]
- News from the Higgs front*
Ricardo Gonçalo
LIP
[LIP Seminar]

- November 13, 2018
Controlled flavor violation in the flavor effective MSSM
Aurora Melis
University of Valencia, Spain
[CFTP Seminar]
- November 15, 2018
Collisions of axion stars with black holes and neutron stars
Katy Clough
University of Oxford, UK
[CENTRA Seminar]
- The LIP teaching laboratory (EduLab): ideas and perspectives*
Catarina Espirito Santo, LIP, and Fernando Barão, LIP and DF, Instituto Superior Técnico
[LIP Seminar]
- November 19, 2018
Space radiation effects on humans and machines
Jorge Miguel Sampaio
LIP
[CENTRA Seminar]
- November 20, 2018
Spontaneous CP violation and scalar FCNC
Miguel Nebot
CFTP, Instituto Superior Técnico
[CFTP Seminar]
- November 22, 2018
Force-free magnetospheres of black holes and neutron stars
Federico Carrasco
Universitat de les Illes Balears, Spain
[CENTRA Seminar]
- Flavour physics studies with top quark and beyond at CMS*
Prof. Kai-Feng Chen
National Taiwan University, Taiwan
[LIP Seminar]
- November 29, 2018
Gravitational energy-momentum and thermodynamics
Giovanni Acquaviva
Charles University Prague, Czech Republic
[CENTRA Seminar]
- Modern meson spectroscopy: the importance of unitarity for experiment, lattice & models*
George Rupp
CeFEMA, Instituto Superior Técnico
[LIP Seminar]
- December 3, 2018
Astronomical computer assisted discoveries, or a new type of CAD
Alberto Krone-Martins
CENTRA and FCUL, Lisboa
[CENTRA Seminar]
- December 4, 2018
Neutrino phenomenology from $A5 \times CP$
Maria Luisa Lopez Ibanez
Roma Tre University, Roma, Italy
[CFTP Seminar]
- December 5, 2018
The highest-energy particles in nature: what they tell us about astrophysics and particle physics
Alan Watson
University of Leeds, UK
[LIP Seminar and DF Colloquium]
- December 6, 2018
Electromagnetic quantum anomalies and applications to black hole astrophysics
Adrian del Rio Vega
CENTRA
[CENTRA Seminar]
- December 13, 2018
Probing the nature of gravity with LIGO-Virgo detections
Michalis Agathos
University of Jena, Germany
[CENTRA Seminar]
- Hot TOPics*
Yvonne Peters
Manchester University, UK
[LIP Seminar]
- December 17, 2018
Supernova classification with active learning
Santiago González-Gaitán
CENTRA
[CENTRA Seminar]
- December 18, 2018
Flavor symmetry as solution of the flavor problem
Gui-Jun Ding,
CUST, Hefei, China
[CFTP Seminar]
- January 3, 2019
The effective field theory of large scale structure
Diogo Bragança
Stanford University, USA
[CENTRA Seminar]
- January 10, 2019
Strong cosmic censorship in charged black hole spacetimes
Kyriakos Destounis
CENTRA
[CENTRA Seminar]
- An $S3$ symmetric model of quarks*
Dipankar Das
University of Calcutta, India and Lund University, Sweden
[CFTP Seminar]
- January 17, 2019
Type II supernova cosmology: past and future
Thomas de Jaeger
UC Berkeley CA., USA
[CENTRA Seminar]
- January 24, 2019
FCT/FCCN – Serviços de vídeo
Nelson Dias, João Gomes e Cláudio Silva
FCCN, Lisboa
[LIP Seminar]
- January 31, 2019
Sachs' constraint-free data in real connection variables
Simone Speziale
Centre de Physique Théorique de Luminy
Marseille, France
[CENTRA Seminar]
- Data protection and best practices for end-users in IT*
Jorge Gomes and Nuno Dias
LIP
[LIP Seminar]
- February 5, 2019
Basis-invariant methods for three-Higgs-doublet models
Igor Ivanov
CFTP, Instituto Superior Técnico
[CFTP Seminar]
- February 7, 2019
Quantum effects near the inner horizon of a black hole
Noa Zilberman
Technion, Haifa, Israel
[CENTRA Seminar]
- The 2018 Nobel Prize in Physics*
José Manuel Rebordão
Faculdade de Ciências, Universidade de Lisboa
[LIP Seminar]
- February 11, 2019
Condensed-matter physics with ultracold atoms: probing the Bogoliubov dispersion relation and the LMG model
Raphael Lopes
Laboratoire Kastler Brossel
Collège de France, Paris, France
[CeFEMA Seminar]
- February 13, 2019
Construction of anti de Sitter-like spacetimes using the metric conformal field equations
Juan Antonio Valiente Kroon
Queen Mary London, UK
[CENTRA Seminar]
- February 14, 2019
Heavy ions results from ATLAS in run 2 of LHC
Helena Santos
LIP
[LIP Seminar]
- February 19, 2019
Energy loss by fast-travelling charged particles traversing two-dimensional materials
Jaime Santos
CFUM, Braga
[CeFEMA Seminar]
- February 20, 2019
Critical phenomena in gravitational collapse
Thomas Baumgarte
Bowdoin College, Brunswick ME., USA
[CENTRA Seminar]
- February 21, 2019
Primordial black hole formation and abundance: dependence on the shape of the inflationary power spectrum
Ilia Musco
University of Barcelona, Spain
[CENTRA Seminar]
- AMBER: unravelling QCD mysteries*
Catarina Quintans
LIP
[LIP Seminar]
- February 28, 2019
Reaching infinity: free hyperboloidal evolution using conformal methods in spherical symmetry
Alex Vano-Vinuales
Cardiff University, UK
[CENTRA Seminar]

- Best practices for end-users in IT*
Nuno Dias
LIP
[LIP Seminar]
- March 6, 2019
Electronic spectral properties of incommensurate van der Waals structures
Bruno Amorim
CeFEMA, Instituto Superior Técnico
[CeFEMA Seminar]
- March 7, 2019
Binary systems in 2+1 dimensions
Carsten Gundlach
University of Southampton, UK
[CENTRA Seminar]
- CMS highlights at the end of LHC Run2*
Nuno Leonardo
LIP
[LIP Seminar]
- March 14, 2019
The Friedrich-Butscher method for the construction of initial data in General Relativity
Jarrod Williams
Queen Mary London, UK
[CENTRA Seminar]
- March 19, 2019
Searching for heavy neutrinos at hadronic colliders
Cédric Weiland
Pittsburgh University, USA
[CFTP Seminar]
- March 20, 2019
Nonequilibrium quantum chains: From ballistic to diffusive transport
Tomaz Prosen
University of Ljubljana, Slovenia
[CeFEMA Seminar]
- Derrick's theorem on curved spacetime and the stability of relativistic stars in modified gravity*
Sante Carloni
CENTRA
[CENTRA Seminar]
- March 21, 2019
The young and the restless stars in the time domain
Lynne Hillenbrand
Caltech, USA
[CENTRA Seminar]
- March 26, 2019
A symmetry-based approach to tensor bases for lattice vertex functions
Milan Vujanovic
University of Graz, Austria
and University of São Paulo, Brazil
[CFTP Seminar]
- March 28, 2019
The $f(R,T)$ theories of gravity applied to stellar astrophysics
Pedro Moraes
ITA, São Paulo, Brazil
[CENTRA Seminar]
- April 3, 2019
Topologically protected quantization of work
Bruno Mera
SQIG – IT, Instituto Superior Técnico
[CeFEMA Seminar]
- April 4, 2019
Exploring the inner few gravitational radii around black holes
Andrew Fabian
Cambridge University, UK
[CENTRA Seminar]
- April 9, 2019
Non-equilibrium dynamics in isolated quantum systems
Masud Haque
Maynooth University, Ireland
[CeFEMA Seminar]
- April 10, 2019
Axial quasinormal modes of scalarized neutron stars
Zahra Motahar
Oldenburg University, Germany
[CENTRA Seminar]
- April 11, 2019
Atomic diffusion and fingering convection inside stars: the micro-macro connexion
Sylvie Vauclair
Toulouse University, France
[CENTRA Seminar]
- April 17, 2019
Diffraction physics with forward proton tagging at the LHC
Trzebinski Maciej
Polish Academy of Sciences, Poland
[LIP Seminar]
- April 30, 2019
Past, present and future on the lattice determinations of α_s
Alberto Ramos
Trinity College Dublin, Ireland
[CFTP Seminar]
- May 2, 2019
How stars challenge our view of dark matter
Grigorios Panotopoulos
CENTRA
[CENTRA Seminar]
- May 3, 2019
Eigenstate thermalization, random matrix theory and behemoths
Paul A. McClarty
MPI-PKS, Dresden, Germany
[CeFEMA Seminar]
- May 9, 2019
Numerical relativity, compact objects, and fundamental fields
Nico Sanchis-Gual
CENTRA
[CENTRA Seminar]
- May 16, 2019
Weiss variation in general relativity
Justin Feng
CENTRA
[CENTRA Seminar]
- May 23, 2019
A gauge-invariant symplectic potential for tetrad general relativity
Elena de Paoli
Université de Marseille, France
[CENTRA Seminar]
- May 30, 2019
Electromagnetism and hidden vector fields in modified gravity theories: Spontaneous and induced vectorization
Lorenzo Annulli
CENTRA
[CENTRA Seminar]
- June 4, 2019
Vacuum instabilities in the N^2 HDM
Rui Santos
CFTC/FCUL and ISEL, Lisboa
[CFTP Seminar]
- June 11, 2019
Echoes from quantum black holes
Qingwen Wang
Perimeter Institute, Canada
[CENTRA Seminar]
- Finite family groups for fermionic and leptoquark mixing patterns*
Jim Talbert,
DESY, Germany
[CFTP Seminar]
- June 14, 2019
Infinite derivative gravity
James Edholm
Lancaster University, UK
[CENTRA Seminar]
- June 19, 2019
Quarkonium strong decays computed from lattice QCD and unitarity
Pedro Bicudo, Marco Cardoso,
Nuno Cardoso and Marc Wagner
CeFEMA
[CeFEMA Seminar]
- What are we learning from the biggest explosions in the Universe?*
Ruben Sanchez Ramirez
CSIC Granada, Spain
[CENTRA Seminar]
- June 27, 2019
Quasinormal modes of black holes: field propagation and stability
Rodrigo Fontana
Universidade Federal da Fronteira do Sul
Chapecó SC, Brazil
[CENTRA Seminar]
- The shadow of a Black Hole (2019) and the problematic measurement of light deflection by the sun in 1919*
Rui Agostinho
FCUL, Lisboa
[LIP Seminar]
- July 4, 2019
Radiation challenges and perspectives for the ESA JUICE mission
Marco Pinto
LIP
[LIP Seminar]

- July 11, 2019
Lepton Flavor Universality tests with semileptonic b -hadron decays
Antonio Romero Vidal
Universidad de Santiago de Compostela, Spain
[LIP Seminar]
- July 26, 2019
Photonics from the macroscale to the nanoscale: Full spectrum solar energy conversion, two-dimensional semiconductors, and optical metasurfaces
Matthew Escarra
Dep. Physics and Engineering Physics
Tulane University, New Orleans LA., USA
[CeFEMA Seminar]
- A Higgs Boson below 125 GeV?!*
Sven Heinemeyer
IFT/IFCA, Santander and CSIC,
Madrid, Spain
[CFTP Seminar]
- July 30, 2019
Long baseline neutrino oscillations with T2K and DUNE
Cristovão Vilela
Stony Brook University NY., USA
[LIP Seminar]
- August 14, 2019
White holes: Theory
Carlo Rovelli
Centre de Physique Théorique de Luminy
of Aix-Marseille University, France
[CENTRA Seminar]
- White holes: Phenomenology*
Francesca Vidotto
Applied Mathematics
University of Western Ontario, Canada
[CENTRA Seminar]
- August 29, 2019
Equilibrium configurations of charged fluids in strong gravity
Eva Hackmann
ZARM, Bremen University, Germany
[CENTRA Seminar]
- September 5, 2019
Zooming out: what a broader view is telling us about stellar and substellar conglomerates
Karla Pena Ramirez
University of Antofagasta, Chile
[CENTRA Seminar]
- September 10, 2019
The circular electron positron collider project
João Guimarães da Costa
Institute of High Energy Physics
Chinese Academy of Sciences, Beijing, China
[LIP Seminar]
- September 11, 2019
Master equations and stability of Einstein-Maxwell-scalar black holes
Aron Jansen
ICC University of Barcelona, Spain
[CENTRA Seminar]
- September 17, 2019
Supernova observations and the interpretation of OGLE-2013-SN-100
Antonia Morales Garoffolo
University of Cádiz, Spain
[CENTRA Seminar]
- September 19, 2019
Stellar populations in the densest stellar systems in the Universe
Nikolay Kacharov
Heidelberg
[CENTRA Seminar]
- Diverse phenomenological studies for the LHC*
Grigorios Chachamis
LIP
[LIP Seminar]
- September 26, 2019
Black hole scalarization in scalar-Gauss-Bonnet gravity
Caio Macedo
Universidade Federal do Pará, Belém, Brazil
[CENTRA Seminar]
- October 3, 2019
Two-body potential of Vainshtein screened theories
Adrien Kuntz
Aix Marseille Univ. and Université de Toulon,
CNRS, CPT, Marseille, France
[CENTRA Seminar]
- An introduction to deep reinforcement-learning*
Giles Strong
LIP
[LIP Seminar]
- October 10, 2019
Tidal deformability of a superfluid neutron star
Prasanta Char
INFN, Italy
[CENTRA Seminar]
- October 15, 2019
Engineering Majorana zero modes
Andrey Antipov
Microsoft Station Q
UC Santa Barbara, USA
[CeFEMA Seminar]
- Twenty years of NASA space missions: Perspective of a Portuguese scientist*
Cristina Oliveira
Space Telescope Science Institute,
Baltimore MD, USA
[CENTRA Seminar]
- October 17, 2019
Modelling dissipation and coupling in neutron stars
Brynmor Haskell
Copernicus Astronomical Center
Warsaw, Poland
[CENTRA Seminar]
- The light sea quarks asymmetry in proton from the SeaQuest experiment at Fermilab*
Marcia Quaresma
LIP
[LIP Seminar]
- October 18, 2019
Resurgence, superconductors and renormalons
Tomás Reis
University of Geneva, Switzerland
[CeFEMA Seminar]
- October 24, 2019
Black hole initial data within the parabolic-hyperbolic formulation
Anna Nakonieczna
University of Warsaw, Poland
[CENTRA Seminar]
- ANTS2 toolkit: interface to Geant4, event analyzer and semi-automatic detector optimization*
Andrey Morozov and Vladimir Solovov
LIP
[LIP Seminar]
- October 28, 2019
Beyond minimal SUSY: the r -symmetric supersymmetric SM
Wojciech Kotlarski
TU Dresden, Germany
[CFTP Seminar]
- October 29, 2019
Overview on the Flavour anomalies
Andreas Crivellin
PSI, Villigen, Switzerland
[CFTP Seminar]
- October 31, 2019
Testing dark energy with gravitational waves
Michele Maggiore
University of Geneva, Switzerland
[CENTRA Seminar]
- Meson resonances and S matrix unitarity from lattice QCD potentials*
Pedro Bicudo
CeFEMA and DE,
Instituto Superior Técnico
[LIP Seminar]
- November 7, 2019
Ultraluminous x -ray sources: an expected population of intermediate mass black holes appears to be super-Eddington neutron stars
Guillermo Rodriguez
INAF – Osservatorio Astronomico
di Roma, Italy
[CENTRA Seminar]
- November 14, 2019
Towards spin qubits with magnetic adatoms
Joaquín Fernández Rossier
INL, Braga
[CeFEMA Seminar]
- The properties of the galactic population of cataclysmic variables from Gaia DR2*
Anna Francesca Pala
ESO, Garching, Germany
[CENTRA Seminar]
- Cosmology in the era of large galaxy surveys*
Rogerio Rosenfeld
IFT, UNESP, São Paulo, Brazil
[CFTP Seminar]
- November 15, 2019
Coherence and dimension witnesses from SWAP tests
Ernesto F. Galvão
INL, Braga and UFF, Niterói RJ, Brazil
[CeFEMA Seminar]

November 21, 2019

Generalized hybrid metric-Palatini gravity
João Luis Rosa
CENTRA
[CENTRA Seminar]

November 26, 2019

Computation of the anomalous magnetic moment of the muon ($g-2$) with lattice QCD
Marina Krstic Marinkovic
GT/CeFEMA visiting scientist
[CeFEMA Seminar]

November 27, 2019

Effective universality and unitarity in quantum gravity, a personal point of view
M. Pawłowski
Institut fuer Theoretische Physik
Heidelberg University, Germany
[CeFEMA Seminar]

November 28, 2019

Impact of multiple modes on the black-hole superradiant instability
Giuseppe Ficarra
“La Sapienza” Università di Roma
and INFN, Italy
[CENTRA Seminar]

November 29, 2019

First results of the SNO+ experiment
Valentina Lozza
LIP
[LIP Seminar]

December 2, 2019

Multi-messenger astrophysics for observing the high-energy universe
Teresa Montaruli
Université de Genève, Switzerland
[LIP Seminar]

December 5, 2019

Localized nonlinear gravitational waves — geons — in asymptotically anti de Sitter spacetimes
Péter Forgács
Wigner Research Center for Physics, Hungary
[CENTRA Seminar]

Titans clash: top quark meets lead ions

Pedro Silva
CERN
[LIP Seminar]

December 10, 2019

Quantum simulation of fermionic systems: towards a QCD-inspired method for existing and near-term quantum computer devices
Emílio Ribeiro
GT CeFEMA
[CeFEMA Seminar]

Baryons in the effective field theory of cosmological large scale structures

Diogo Bragança
Stanford University, USA
[CENTRA Seminar]

December 12, 2019

Weak cosmic censorship in Einstein-scalar theory
Bogdan Ganchev
DAMTP, University of Cambridge, UK
[CENTRA Seminar]

A new era in exotic nuclear physics: FAIR

Daniel Galaviz
LIP and FCUL, Lisboa
[LIP Seminar]

December 17, 2019

Space-time metamaterials: from graphene plasmon amplification to the Fresnel drag of light
Paloma Arroyo Huidobro
Instituto de Telecomunicações, Lisboa
[CeFEMA Seminar]



CONFERENCES AND WORKSHOPS

January 22–26, 2018

Gravity@Malta
La Valletta, Malta
[CENTRA]

February 5–6, 2018

José Fest: Black Holes are Forever
Lisboa, Portugal
[CENTRA]

March 3, 2018

CENTRA Meeting
Lisboa, Portugal
[CENTRA]

April 12–13, 2018

Neutron Stars in Lisboa
Lisboa, Portugal
[CENTRA]

June 3–9, 2018

Numerical Relativity beyond General Relativity
Lisboa, Portugal
[CENTRA]

August 28–31, 2018

IAU Symposium 348: 21st Century Astrometry:
Crossing the Dark and Habitable Frontiers
Vienna, Austria
[CENTRA]

September 1–14, 2018

Dynamics in Strong Gravity Universe
YITP, Kyoto, Japan
[CENTRA]

September 4–7, 2018

Fifth Workshop on Multi-Higgs Models
IST, Lisboa, Portugal
[CFTP]



Fourth Lisbon mini-school on Particle and Astroparticle Physics in Costa da Caparica.

SCHOOLS

December 11–12, 2018
International Workshop on Dark Matter and Stars (IWDMS 2018)
IST, Lisboa, Portugal
[CENTRA]

December 17–18, 2018
XI Black Holes Workshop:
The Black Hole: 50 Years After
IST, Lisboa, Portugal
[CENTRA]

January 14–17, 2019
Workshop on Higgs and Flavour Physics,
Present and Future
IST, Lisboa, Portugal
[CFTP]

January 16–18, 2019
Tests of Gravity
University of Athens, Greece
[CENTRA]

February 22–23, 2019
Ferrari Fest (a Symposium honouring Valeria Ferrari)
University of Roma “La Sapienza”, Italy
[CENTRA]

March 16, 2019
CENTRA Meeting
Lisboa, Portugal
[CENTRA]

March 26–27, 2019
5th Workshop on Microfluidics Standards
Lisboa, Portugal
[INESC–MN]

June 24–27, 2019
Magnetic Frontiers: Magnetic Sensors
Lisboa, Portugal
[INESC–MN]

September 4–6, 2019
1st MPFL Research Symposium
Lisboa, Portugal
[INESC–MN]

September 16–17, 2019
Jornadas CeFEMA,
Lisboa, Portugal
[CeFEMA]

October 15, 2019
Higgs and Flavour Today: GUIFEST
IFIC, Valencia, Spain
[CFTP and IFIC]

February 5–7, 2018
3rd Lisbon mini-school on particle
and astroparticle Physics
Caparica, Portugal
[CFTP and LIP]

March 6–May 9, 2018
Course on Physics at the LHC
LIP, Lisboa, Portugal
[LIP]

July 9–14, 2018
2018 VLTI Summer School
FCUL, Lisboa, Portugal
[CENTRA]

September 3–7, 2018
9th CENTRA Astrophysics and Gravitation
School
IST, Lisboa, Portugal
[CENTRA]

September 10–13, 2018
European Einstein Toolkit Workshop 2018
IST, Lisboa, Portugal
[CENTRA]

February 11–13, 2019
4th Lisbon mini-school on Particle
and Astroparticle Physics
Caparica, Portugal
[CFTP and LIP]

September 23–27, 2019
1st COST–MAGNETOFON Summer School,
dedicated to the emerging field of ultrafast
opto-magneto-electronics
Lisboa, Portugal
[INESC–MN]

SCIENTIFIC PUBLICATIONS

2018

- Aab, A. et al. (2018). Erratum: Combined fit of spectrum and composition data as measured by the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, 2018 (03), E02–E02. doi:10.1088/1475-7516/2018/03/e02
- Aab, A., Abreu, P., Aglietta, M. et al. (2018). Large-scale cosmic-ray anisotropies above 4 EeV measured by the Pierre Auger Observatory. *The Astrophysical Journal*, 868(1), 4. doi:10.3847/1538-4357/aae689
- Aaboud, M. et al. (2018). A search for pair-produced resonances in four-jet final states at $\sqrt{s}=13$ TeV with the ATLAS detector. *The European Physical Journal C*, 78(3). doi:10.1140/epjc/s10052-018-5693-4
- Aaboud, M. et al. (2018). Angular analysis of $B_d^0 \rightarrow K^* \mu^+ \mu^-$ decays in pp collisions at $\sqrt{s}=8$ TeV with the ATLAS detector. *Journal of High Energy Physics*, 2018(10). doi:10.1007/jhep10(2018)047
- Aaboud, M. et al. (2018). Combination of searches for heavy resonances decaying into bosonic and leptonic final states using 36 fb⁻¹ of proton–proton collision data at $\sqrt{s}=13$ TeV with the ATLAS detector. *Physical Review D*, 98(5). doi:10.1103/physrevd.98.052008
- Aaboud, M. et al. (2018). Combined measurement of differential and total cross sections in the $H \rightarrow \gamma\gamma$ and the $H \rightarrow ZZ^* \rightarrow 4l$ decay channels at $\sqrt{s}=13$ TeV with the ATLAS detector. *Physics Letters B*, 786, 114–133. doi:10.1016/j.physletb.2018.09.019
- Aaboud, M. et al. (2018). Comparison between simulated and observed LHC beam backgrounds in the ATLAS experiment at $E_{\text{beam}}=4$ TeV. *Journal of Instrumentation*, 13(12), P12006–P12006. doi:10.1088/1748-0221/13/12/p12006
- Aaboud, M. et al. (2018). Constraints on off-shell Higgs boson production and the Higgs boson total width in $ZZ \rightarrow 4l$ and $ZZ \rightarrow 2l2\nu$ final states with the ATLAS detector. *Physics Letters B*, 786, 223–244. doi:10.1016/j.physletb.2018.09.048
- Aaboud, M. et al. (2018). Direct top-quark decay width measurement in the $t(\bar{t})$ lepton plus jets channel at $\sqrt{s}=8$ TeV with the ATLAS experiment. *The European Physical Journal C*, 78(2). doi:10.1140/epjc/s10052-018-5595-5
- Aaboud, M. et al. (2018). Observation of centrality-dependent acoplanarity for muon pairs produced via two-photon scattering in Pb+Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV with the ATLAS detector. *Physical Review Letters*, 121(21). doi:10.1103/physrevlett.121.212301
- Aaboud, M. et al. (2018). Observation of $H \rightarrow b\bar{b}$ decays and VH production with the ATLAS detector. *Physics Letters B*, 786, 59–86. doi:10.1016/j.physletb.2018.09.013
- Aaboud, M. et al. (2018). Probing the quantum interference between singly and doubly resonant top-quark production in pp collisions at $\sqrt{s}=13$ TeV with the ATLAS detector. *Physical Review Letters*, 121(15). doi:10.1103/physrevlett.121.152002
- Aaboud, M. et al. (2018). Prompt and non-prompt J/ψ and $\psi(2S)$ suppression at high transverse momentum in 5.02 TeV Pb+Pb collisions with the ATLAS experiment. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6219-9
- Aaboud, M. et al. (2018). Prompt and non-prompt J/ψ elliptic flow in Pb plus Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV with the ATLAS detector. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6243-9
- Aaboud, M. et al. (2018). Combination of inclusive and differential $t\bar{t}$ charge asymmetry measurements using ATLAS and CMS data at $\sqrt{s}=7$ and 8 TeV. *Journal of High Energy Physics*, 2018(4). doi:10.1007/jhep04(2018)033.
- Aaboud, M. et al. (2018). Search for a heavy Higgs boson decaying into a Z boson and another heavy Higgs boson in the $llbb$ final state in pp collisions at $\sqrt{s}=13$ TeV with the ATLAS detector. *Physics Letters B*, 783, 392–414. doi:10.1016/j.physletb.2018.07.006
- Aaboud, M. et al. (2018). Search for new physics in events with a leptonically decaying Z boson and a large transverse momentum imbalance in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(4). doi:10.1140/epjc/s10052-018-5740-1
- Abreu, P. et al. (2018). MARTA: a high-energy cosmic-ray detector concept for high-accuracy muon measurement. *The European Physical Journal C*, 78(4). doi:10.1140/epjc/s10052-018-5820-2
- Adamczewski-Musch, J. et al. (2018). Centrality determination of Au + Au collisions at 1.23A GeV with HADES. *The European Physical Journal A*, 54(5). doi:10.1140/epja/i2018-12513-7
- Adamczewski-Musch, J. et al. (2018). Deep sub-threshold ϕ production in Au+Au collisions. *Physics Letters B*, 778, 403–407. doi:10.1016/j.physletb.2018.01.048
- Adamczewski-Musch, J. et al. (2018). Σ^0 production in proton nucleus collisions near threshold. *Physics Letters B*, 781, 735–740. doi:10.1016/j.physletb.2018.02.043
- Adolph, C. et al. (2018). Azimuthal asymmetries of charged hadrons produced in high-energy muon scattering off longitudinally polarised deuterons. *The European Physical Journal C*, 78(11). doi:10.1140/epjc/s10052-018-6379-7
- Aghasyan, M. et al. (2018). Light isovector resonances in $\pi^-p \rightarrow \pi^-\pi^-\pi^+p$ at 190 GeV/c. *Physical Review D*, 98(9). doi:10.1103/physrevd.98.092003
- Aghasyan, M. et al. (2018). Longitudinal double-spin asymmetry A_{1p} and spin-dependent structure function g_{1p} of the proton at small values of x and Q^2 . *Physics Letters B*, 781, 464–472. doi:10.1016/j.physletb.2018.03.044
- Aghasyan, M. et al. (2018). Search for muoproduction of $X(3872)$ at COMPASS and indication of a new state $X^-(3872)$. *Physics Letters B*, 783, 334–340. doi:10.1016/j.physletb.2018.07.008
- Aghasyan, M. et al. (2018). Transverse-momentum-dependent multiplicities of charged hadrons in muon-deuteron deep inelastic scattering. *Physical Review D*, 97(3). doi:10.1103/physrevd.97.032006
- Agostinho, N. R., Branco, G. C., Pereira, P. M. F., Rebelo, M. N., & Silva-Marcos, J. I. (2018). Can one have significant deviations from leptonic 3×3 unitarity in the framework of type I seesaw mechanism? *The European Physical Journal C*, 78(11). doi:10.1140/epjc/s10052-018-6347-2
- Aguiam, D. E. et al. (2018). Estimation of x-mode reflectometry first fringe frequency using neural networks. *IEEE Transactions on Plasma Science*, 46(5), 1323–1330. doi:10.1109/tps.2018.2789684
- Aguilar, M. et al. (2018). Observation of new properties of secondary cosmic rays lithium, beryllium, and boron by the alpha magnetic spectrometer on the international space station. *Physical Review Letters*, 120(2). doi:10.1103/physrevlett.120.021101
- Aguilar, M. et al. (2018). Precision measurement of cosmic-ray nitrogen and its primary and secondary components with the alpha magnetic spectrometer on the international space station. *Physical Review Letters*, 121(5). doi:10.1103/physrevlett.121.051103
- Akhunzyanov, R. et al. (2018). K^- over K^+ multiplicity ratio for kaons produced in DIS with a large fraction of the virtual-photon energy. *Physics Letters B*, 786, 390–398. doi:10.1016/j.physletb.2018.09.052
- Alonso, M. P., Pinheiro, M. J., Lobo, R. F. M., & Spodek, J. (2018, June). Improving the unreasonable university. *2018 3rd International Conference of the Portuguese Society for Engineering Education (CIS-PEE)*. doi:10.1109/cispee.2018.8593474
- Alves, L. L., Belmonte, T., & Minea, T. (2018). Topical issue “Plasma Sources and Plasma Processes

- (PSPP).” *The European Physical Journal Applied Physics*, 82(1), 10801. doi:10.1051/epjap/2018180117
- Alves, L. L., Bogaerts, A., Guerra, V., & Turner, M. M. (2018). Foundations of modelling of nonequilibrium low-temperature plasmas. *Plasma Sources Science and Technology*, 27(2), 023002. doi:10.1088/1361-6595/aaa86d
- Amaral, A., Lavareda, G., Nunes de Carvalho, C., André, V., Vygranenko, Y., Fernandes, M., & Brogueira, P. (2018). Etchability dependence of InOx and ITO thin films by plasma enhanced reactive thermal evaporation on structural properties and deposition conditions. *MRS Advances*, 3(4), 207–212. doi:10.1557/adv.2018.113
- Amin, S. T., Mera, B., Vlachou, C., Paunković, N., & Vieira, V. R. (2018). Fidelity and Uhlmann connection analysis of topological phase transitions in two dimensions. *Physical Review B*, 98(24). doi:10.1103/physrevb.98.245141
- Annulli, L., Bernard, L., Blas, D., & Cardoso, V. (2018). Scattering of scalar, electromagnetic, and gravitational waves from binary systems. *Physical Review D*, 98(8). doi:10.1103/physrevd.98.084001
- Annušová, A., Marinov, D., Booth, J.-P., Sirse, N., da Silva, M. L., Lopez, B., & Guerra, V. (2018). Kinetics of highly vibrationally excited O₂(X) molecules in inductively-coupled oxygen plasmas. *Plasma Sources Science and Technology*, 27(4), 045006. doi:10.1088/1361-6595/aab47d
- Apolinario, L. (2018). Overview of jet quenching and energy loss in heavy-ion collisions. Proceedings of Sixth Annual Conference on Large Hadron Collider Physics – PoS(LHCP2018). *Sixth Annual Conference on Large Hadron Collider Physics*. doi:10.22323/1.321.0219
- Apolinário, L., Milhano, J. G., Ploskon, M., & Zhang, X. (2018). Novel subject observables for jet quenching in heavy-ion collisions. *The European Physical Journal C*, 78(6). doi:10.1140/epjc/s10052-018-5999-2
- Apolinário, L., Milhano, J. G., Salam, G. P., & Salgado, C. A. (2018). Probing the time structure of the quark-gluon plasma with top quarks. *Physical Review Letters*, 120(23). doi:10.1103/physrevlett.120.232301
- Arruda, L., Goncalves, P., Carvalho, F., Marques, A., Costa Pinto, J., Aguiar, A., Marinho, P., Sousa, T., Evans, H., & Nieminen, P. (2018). Electrons in GEO measured with the ESA multifunctional spectrometer during the January 2014 SEP. *IEEE Transactions on Nuclear Science*, 65(8), 1540–1545. doi:10.1109/tns.2018.2854161
- Assis, P., Barres de Almeida, U., Blanco, A. et al. (2018). Design and expected performance of a novel hybrid detector for very-high-energy gamma-ray astrophysics. *Astroparticle Physics*, 99, 34–42. doi:10.1016/j.astropartphys.2018.02.004
- Assis, P., Barres de Almeida, U., Blanco, A. et al. (2018). Erratum to “Design and expected performance of a novel hybrid detector for very-high-energy gamma-ray astrophysics” [Astropart. Phys. 99 (2018) 34–42]. *Astroparticle Physics*, 101, 36. doi:10.1016/j.astropartphys.2018.03.003
- Assis, P., Blanco, A., Brogueira, P., Ferreira, M., & Luz, R. (2018). The MARTA (Muon Array With RPCs for Tagging Air Showers) front-end acquisition system. *IEEE Transactions on Nuclear Science*, 65(12), 2920–2928. doi:10.1109/tns.2018.2879089
- Assumpção, T., Cardoso, V., Ishibashi, A., Richartz, M., & Zilhão, M. (2018). Black hole binaries: Ergoregions, photon surfaces, wave scattering, and quasinormal modes. *Physical Review D*, 98(6). doi:10.1103/physrevd.98.064036
- Atar, L. et al. (2018). Quasifree (p , $2p$) reactions on oxygen isotopes: observation of isospin independence of the reduced single-particle strength. *Physical Review Letters*, 120(5). doi:10.1103/physrevlett.120.052501
- Baibhav, V., Berti, E., Cardoso, V., & Khanna, G. (2018). Black hole spectroscopy: Systematic errors and ringdown energy estimates. *Physical Review D*, 97(4). doi:10.1103/physrevd.97.044048
- Balland, C. et al. (2018). The ESO’s VLT type Ia supernova spectral set of the final two years of SNLS. *Astronomy & Astrophysics*, 614, A134. doi:10.1051/0004-6361/201731924
- Barata, J., Apolinario, L., & Milhano, J. G. (2018). Quark and gluon jet energy loss. Proceedings of international conference on hard and electromagnetic probes of high-energy nuclear collisions – PoS(HardProbes2018). *International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions*. doi:10.22323/1.345.0082
- Barausse, E., Brito, R., Cardoso, V., Dvorkin, I., & Pani, P. (2018). The stochastic gravitational-wave background in the absence of horizons. *Classical and Quantum Gravity*, 35(20), 20LT01. doi:10.1088/1361-6382/aae1de
- Batista, A. J. N., Naylor, G., Capellà, L., et al. (2018). Testing results of chopper based integrator prototypes for the ITER magnetics. *Fusion Engineering and Design*, 128, 193–197. doi:10.1016/j.fusengdes.2018.01.065
- Batistoni, P., Popovichev, S., Cufar, A. et al. (2018). 14 MeV calibration of JET neutron detectors. Phase 1: calibration and characterization of the neutron source. *Nuclear Fusion*, 58(2), 026012. doi:10.1088/1741-4326/aa98f6
- Beira, M. J., Silva, M. P., Condesso, M., Cosme, P., Almeida, P. L., Corvo, M. C., Sebastião, P. J., Figueirinhas, J. L., & de Pinho, M. N. (2018). Molecular order and dynamics of water in hybrid cellulose acetate-silica asymmetric membranes. *Molecular Physics*, 117(7–8), 975–982. doi:10.1080/00268976.2018.1537526
- Bélusca-Maito, H., Falkowski, A., Fontes, D., Romão, J. C., & Silva, J. P. (2018). CP violation in 2HDM and EFT: the ZZZ vertex. *Journal of High Energy Physics*, 2018(4). doi:10.1007/jhep04(2018)002.
- Bento, M. P., Haber, H. E., Romão, J. C., & Silva, J. P. (2018). Multi-Higgs doublet models: the Higgs-fermion couplings and their sum rules. *Journal of High Energy Physics*, 2018(10). doi:10.1007/jhep10(2018)143
- Bernal, N., Cárcamo Hernández, A. E., de Medeiros Varzielas, I., & Kovalenko, S. (2018). Fermion masses and mixings and dark matter constraints in a model with radiative seesaw mechanism. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)053.
- Bhattacharya, S., de Medeiros Varzielas, I., Karmakar, B., King, S. F., & Sil, A. (2018). Dark side of the seesaw. *Journal of High Energy Physics*, 2018(12). doi:10.1007/jhep12(2018)007
- Bicudo, P., Cardoso, N., & Cardoso, M. (2018). Color field densities of the quark-antiquark excited flux tubes in SU(3) lattice QCD. *Physical Review D*, 98(11). doi:10.1103/physrevd.98.114507
- Biernat, E. P., Gross, F., Peña, M. T., Stadler, A., & Leitão, S. (2018). Quark mass function from a one-gluon-exchange-type interaction in Minkowski space. *Physical Review D*, 98(11). doi:10.1103/physrevd.98.114033
- Biernat, E. P., Gross, F., Peña, T., Stadler, A., & Leitão, S. (2018). Quark mass functions and pion structure in the covariant spectator theory. *Few-Body Systems*, 59(5). doi:10.1007/s00601-018-1401-z
- Bizarro, J. P. S., Hugon, H., & Jorge, R. (2018). Quasilinear approach to ray tracing in weakly turbulent, randomly fluctuating media. *Physical Review A*, 98(2). doi:10.1103/physreva.98.023847
- Boella, E., Fiúza, F., Novo, A. S., Fonseca, R., & Silva, L. O. (2018). Ion acceleration in electrostatic collisionless shock: on the optimal density profile for quasi-monoenergetic beams. *Plasma Physics and Controlled Fusion*, 60(3), 035010. doi:10.1088/1361-6587/aaa556
- Bošković, M., Duque, F., Ferreira, M. C., Miguel, F. S., & Cardoso, V. (2018). Motion in time-periodic backgrounds with applications to ultralight dark matter halos at galactic centers. *Physical Review D*, 98(2). doi:10.1103/physrevd.98.024037
- Brito, A., & Lopes, I. (2018). FromCool to hot F-stars: The influence of two ionization regions in the acoustic oscillations. *The Astrophysical Journal*, 853(2), 183. doi:10.3847/1538-4357/aaa430
- Cao, J., Chen, Y., Jin, T., Gan, W., Wang, Y., Zheng, Y., Lv, H., Cardoso, S., Wei, D., & Lew, W. S. (2018). Spin orbit torques induced magnetization reversal through asymmetric domain wall propagation in Ta/CoFeB/MgO structures. *Scientific Reports*, 8(1). doi:10.1038/s41598-018-19927-5
- Cardoso, V., Castro, G., & Maselli, A. (2018). Gravitational waves in massive gravity theories: waveforms, fluxes, and constraints from extreme-mass-ratio mergers. *Physical Review Letters*, 121(25). doi:10.1103/physrevlett.121.251103

- Cardoso, V., Costa, J. L., Destounis, K., Hintz, P., & Jansen, A. (2018). Quasinormal modes and strong cosmic censorship. *Physical Review Letters*, 120(3). doi:10.1103/physrevlett.120.031103
- Cardoso, V., Costa, J. L., Destounis, K., Hintz, P., & Jansen, A. (2018). Strong cosmic censorship in charged black-hole spacetimes: Still subtle. *Physical Review D*, 98(10). doi:10.1103/physrevd.98.104007
- Cardoso, V., Dias, Ó. J. C., Hartnett, G. S., Middleton, M., Pani, P., & Santos, J. E. (2018). Constraining the mass of dark photons and axion-like particles through black-hole superradiance. *Journal of Cosmology and Astroparticle Physics*, 2018(03), 043–043. doi:10.1088/1475-7516/2018/03/043
- Cardoso, V., Houri, T., & Kimura, M. (2017). General first-order mass ladder operators for Klein–Gordon fields. *Classical and Quantum Gravity*, 35(1), 015011. doi:10.1088/1361-6382/aa9a04
- Cardoso, V., Ikeda, T., Moore, C. J., & Yoo, C.-M. (2018). Remarks on the maximum luminosity. *Physical Review D*, 97(8). doi:10.1103/physrevd.97.084013
- Cardoso, V., Kimura, M., Maselli, A., & Senatore, L. (2018). Black holes in an effective field theory extension of general relativity. *Physical Review Letters*, 121(25). doi:10.1103/physrevlett.121.251105
- Carmelo, J. M. P., & Sacramento, P. D. (2018). Pseudoparticle approach to *1D integrable quantum models*. *Physics Reports*, 749, 1–90. doi:10.1016/j.physrep.2018.06.004
- Carvalho, H., Vale, A., Marques, R., Ventura, R., Brouwer, Y., & Gonçalves, B. (2018). Remote inspection with multi-copters, radiological sensors and SLAM techniques. *EPJ Web of Conferences*, 170, 07014. doi:10.1051/epjconf/201817007014
- Carvalho, P. F. et al. (2018). Monitoring and hardware management for critical fusion plasma instrumentation. *EPJ Web of Conferences*, 170, 02002. doi:10.1051/epjconf/201817002002
- Castro, A., Cardoso, J. P., Mendes, L. F., Azevedo, P., & Mendes, J. F. (2018). Pre-heating boiler feedwater for expanded cork agglomerate production using a parabolic trough system. *SolarPACES 2017: International Conference on Concentrating Solar Power and Chemical Energy Systems*. doi:10.1063/1.5067155
- Castro, E. V., Flachi, A., Ribeiro, P., & Vitagliano, V. (2018). Symmetry Breaking and Lattice Kirigami. *Physical Review Letters*, 121(22). doi:10.1103/physrevlett.121.221601
- Cazon, L., Conceição, R., & Riehn, F. (2018). Probing the energy spectrum of hadrons in proton air interactions at ultrahigh energies through the fluctuations of the muon content of extensive air showers. *Physics Letters B*, 784, 68–76. doi:10.1016/j.physletb.2018.07.026
- Cerquido, M., Proença, M. P., Dias, C., Leitao, D. C., Cardoso, S., Freitas, P. P., Aguiar, P., & Ventura, J. (2018). Tailoring the cap's morphology of electrodeposited gold micro-mushrooms. *Applied Surface Science*, 445, 512–518. doi:10.1016/j.apusc.2018.03.158
- Chicharo, A., Barnsley, L. C., Martins, M., Cardoso, S., Dieguez, L., Espina, B., & Freitas, P. P. (2018). Custom magnet design for a multi-channel magnetic microcytometer. *IEEE Transactions on Magnetics*, 54(11), 1–5. doi:10.1109/tmag.2018.2835369
- Chicharo, A., Martins, M., Barnsley, L. C., Taouallah, A., Fernandes, J., Silva, B. F. B., Cardoso, S., Diéguez, L., Espiña, B., & Freitas, P. P. (2018). Enhanced magnetic microcytometer with 3D flow focusing for cell enumeration. *Lab on a Chip*, 18(17), 2593–2603. doi:10.1039/c8lc00486b
- Correia, M. R., & Cardoso, V. (2018). Characterization of echoes: A Dyson-series representation of individual pulses. *Physical Review D*, 97(8). doi:10.1103/physrevd.97.084030
- Costa, L. F. O., Franco, R., & Cardoso, V. (2018). Gravitational Magnus effect. *Physical Review D*, 98(2). doi:10.1103/physrevd.98.024026
- Crespo, R., Cravo, E., Arriaga, A., Wiringa, R., Deltuva, A., & Diego, R. (2018). Merging first principle structure studies and few-body reaction formalism. *Journal of Physics: Conference Series*, 966, 012056. doi:10.1088/1742-6596/966/1/012056
- Crespo, R., & Cravo, E. (2018). Critical Phenomena: Coexistence of Valence Single Particle and Core-Excitations in the ^{11}Be Halo Nucleus. *Few-Body Systems*, 59(2). doi:10.1007/s00601-018-1330-x
- Cruz, N., Martin, Y., Moret, J.-M. et al. (2018). On the control system preparation for ELM pacing with vertical kicks experiments at TCV. *Fusion Engineering and Design*, 129, 247–252. doi:10.1016/j.fusengdes.2018.02.078
- Dainese, A., Apolinario, L., Armesto, N. et al. (2018). Future heavy-ion facilities: FCC-AA. Proceedings of International Conference on Hard and electromagnetic probes of high-energy nuclear collisions – PoS (HardProbes2018). *International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions*. doi:10.22323/1.345.0005
- de Medeiros Varzielas, I. (2018). Minima of multi-Higgs potentials with triplets of $\Delta(3n2)$ and $\Delta(6n2)$. Proceedings. *Corfu Summer Institute 2017 “Schools and Workshops on Elementary Particle Physics and Gravity”*. doi:10.22323/1.318.0083
- de Medeiros Varzielas, I., López-Ibáñez, M. L., Melis, A., & Vives, O. (2018). Controlled flavor violation in the MSSM from a unified $\Delta(27)$ flavor symmetry. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)047
- de Medeiros Varzielas, I., Neder, T., & Zhou, Y.-L. (2018). Effective alignments as building blocks of flavor models. *Physical Review D*, 97(11). doi:10.1103/physrevd.97.115033
- de Medeiros Varzielas, I., Ross, G. G., & Talbert, J. (2018). A unified model of quarks and leptons with a universal texture zero. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)007.
- de Medeiros Varzielas, I., & King, S. F. (2018). $R_{K^*} \{R_{K^*}^{\text{left}}\}$ with leptoquarks and the origin of Yukawa couplings. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)100
- Dias, M., Guerreiro, F., Tejado, E., Correia, J. B., Mardolcar, U. V., Coelho, M., Palacios, T., Pastor, J. Y., Carvalho, P. A., & Alves, E. (2018). WC-Cu thermal barriers for fusion applications. *Surface and Coatings Technology*, 355, 222–226. doi:10.1016/j.surfcoat.2018.02.086
- Dias, M., Ruza, A., Guerreiro, F., da Silva, R. C., Gonçalves, A. P., Mardolcar, U. V., & Alves, E. (2018). $\text{Cu}_x\text{CrFeMoTi}$ ($x = 0.21, 0.44, 1$) high entropy alloys as novel materials for fusion applications. *Materials Science and Engineering: B*, 238–239, 18–25. doi:10.1016/j.mseb.2018.11.026
- Díaz Fernández, P. et al. (2018). Quasifree (p,pN) scattering of light neutron-rich nuclei near $N=14$. *Physical Review C*, 97(2). doi:10.1103/physrevc.97.024311
- Dinklage, A., Beidler, C. D., Helander, P. et al. (2018). Magnetic configuration effects on the Wendelstein 7-X stellarator. *Nature Physics*, 14(8), 855–860. doi:10.1038/s41567-018-0141-9
- Faccioli, P., Lourenço, C., Araújo, M., Seixas, J., Krätschmer, I., & Knünz, V. (2018). From identical S- and P-wave p_T spectra to maximally distinct polarizations: probing NRQCD with χ states. *The European Physical Journal C*, 78(3). doi:10.1140/epjc/s10052-018-5755-7
- Faccioli, P., Lourenço, C., Araújo, M., & Seixas, J. (2018). Universal kinematic scaling as a probe of factorized long-distance effects in high-energy quarkonium production. *The European Physical Journal C*, 78(2). doi:10.1140/epjc/s10052-018-5610-x
- Fajardo, M., & Dendy, R. (2017). 44th European physical society conference on plasma physics. *Plasma Physics and Controlled Fusion*, 60(1), 010101. doi:10.1088/1361-6587/aa9775
- Faria, M., Moreira, C., Mendonça Eusébio, T., de Pinho, M. N., Brogueira, P., & Semião, V. (2018). Oxygen mass transfer in a gas/membrane/liquid system surrogate of membrane blood oxygenators. *AIChE Journal*, 64(10), 3756–3763. doi:10.1002/aic.16328.
- Ferreira, D. R., Carvalho, P. J., Fernandes, H., & JET Contributors. (2018). Full-Pulse Tomographic Reconstruction with Deep Neural Networks. *Fusion Science and Technology*, 74(1–2), 47–56. doi:10.1080/15361055.2017.1390386
- Fischer, C., & Eichmann, G. (2018). Overview of multi-quark states. Proceedings of xvii international conference on hadron spectroscopy and structure – PoS (Hadron2017). *XVII International*

- Conference on Hadron Spectroscopy and Structure. doi:10.22323/1.310.0007
- Fontes, D., Mühlleitner, M., Romão, J. C., Santos, R., Silva, J. P., & Wittbrodt, J. (2018). The C2HDM revisited. *Journal of High Energy Physics*, 2018(2). doi:10.1007/jhep02(2018)073.
- Galbany, L. et al. (2018). PISCO: The PMAS/PPak Integral-field Supernova Hosts Compilation. *The Astrophysical Journal*, 855(2), 107. doi:10.3847/1538-4357/aaaf20
- Gonçalves, M., Ribeiro, P., & Castro, E. V. (2019). Dirac points merging and wandering in a model Chern insulator. *EPL (Europhysics Letters)*, 124(6), 67003. doi:10.1209/0295-5075/124/67003
- Grofulović, M., Silva, T., Klarenaar, B. L. M., Morillo-Candas, A. S., Guaitella, O., Engeln, R., Pintassilgo, C. D., & Guerra, V. (2018). Kinetic study of CO₂ plasmas under non-equilibrium conditions. II. Input of vibrational energy. *Plasma Sources Science and Technology*, 27(11), 115009. doi:10.1088/1361-6595/aadb60
- Guedes, A., Macedo, R., Jaramillo, G., Cardoso, S., Freitas, P., & Horsley, D. (2018). Hybrid GMR sensor detecting 950 pT/sqrt(Hz) at 1 Hz and room temperature. *Sensors*, 18(3), 790. doi:10.3390/s18030790
- Guerra, V., Silva, T., Ogloblina, P., Grofulović, M., Terraz, L., Silva, M. L. da, Pintassilgo, C. D., Alves, L. L., & Guaitella, O. (2018). Reply to Comment on “The case for in situ resource utilisation for oxygen production on Mars by non-equilibrium plasmas.” *Plasma Sources Science and Technology*, 27(2), 028002. doi:10.1088/1361-6595/aaa570
- Hopper, S., & Cardoso, V. (2018). Scattering of point particles by black holes: Gravitational radiation. *Physical Review D*, 97(4). doi:10.1103/physrevd.97.044031
- Hu, L.-X., Yu, T.-P., Sheng, Z.-M., Vieira, J., Zou, D.-B., Yin, Y., McKenna, P., & Shao, F.-Q. (2018). Attosecond electron bunches from a nanofiber driven by Laguerre-Gaussian laser pulses. *Scientific Reports*, 8(1). doi:10.1038/s41598-018-25421-9
- Iannone, F., Bracco, G., Cavazzoni, C. et al (2018). MARCONI-FUSION: The new high performance computing facility for European nuclear fusion modelling. *Fusion Engineering and Design*, 129, 354–358. doi:10.1016/j.fusengdes.2017.11.004
- Ikeda, T., Yoo, C.-M., & Cardoso, V. (2018). Oscillon in Einstein-scalar system with double well potential and its properties. *EPJ Web of Conferences*, 168, 03005. doi:10.1051/epjconf/201816803005
- Iulianelli, G. C. V., David, G. dos S., dos Santos, T. N., Sebastião, P. J. O., & Tavares, M. I. B. (2018). Influence of TiO₂ nanoparticle on the thermal, morphological and molecular characteristics of PHB matrix. *Polymer Testing*, 65, 156–162. doi:10.1016/j.polymertesting.2017.11.018
- Jackura, A. et al (2018). New analysis of $\eta\pi$ tensor resonances measured at the COMPASS experiment. *Physics Letters B*, 779, 464–472. doi:10.1016/j.physletb.2018.01.017
- Lemos, N., Cardoso, L., Geada, J., Figueira, G., Albert, F., & Dias, J. M. (2018). Guiding of laser pulses in plasma waveguides created by linearly-polarized femtosecond laser pulses. *Scientific Reports*, 8(1). doi:10.1038/s41598-018-21392-z
- Lopes, A., Luís, R., Klinkby, E. et al. (2018). Neutronics analysis of the ITER collective Thomson scattering system. *Fusion Engineering and Design*, 134, 22–28. doi:10.1016/j.fusengdes.2018.06.008
- Malaquias, A., Silva, A., Moutinho, R. et al. (2018). Integration concept of the reflectometry diagnostic for the main plasma in DEMO. *IEEE Transactions on Plasma Science*, 46(2), 451–457. doi:10.1109/tps.2017.2784785
- Martinho, E., Mendes, M., & Dionísio, A. (2017). 3D imaging of P-waves velocity as a tool for evaluation of heat induced limestone decay. *Construction and Building Materials*, 135, 119–128. doi:10.1016/j.conbuildmat.2016.12.192
- Maselli, A., Pani, P., Cardoso, V., Abdelsalhin, T., Gualtieri, L., & Ferrari, V. (2018). Probing Planckian Corrections at the horizon scale with LISA binaries. *Physical Review Letters*, 120(8). doi:10.1103/physrevlett.120.081101
- Massacrier, L., Anselmino, M., Arnaldi, R. et al. (2018). Physics perspectives with AFTER@LHC (A Fixed Target Experiment at LHC). *EPJ Web of Conferences*, 171, 10001. doi:10.1051/epjconf/201817110001
- Mendonça, J. T., Serbeto, A., & Vieira, J. (2018). Plasmon excitations with a semi-integer angular momentum. *Scientific Reports*, 8(1). doi:10.1038/s41598-018-26196-9
- Mendonça, J. T., Terças, H., & Gammal, A. (2018). Quantum Landau damping in dipolar Bose-Einstein condensates. *Physical Review A*, 97(6). doi:10.1103/physreva.97.063610
- Mera, B., Vlachou, C., Paunković, N., Vieira, V. R., & Viyuela, O. (2018). Dynamical phase transitions at finite temperature from fidelity and interferometric Loschmidt echo induced metrics. *Physical Review B*, 97(9). doi:10.1103/physrevb.97.094110
- Milhano, G., Wiedemann, U. A., & Zapp, K. C. (2018). Sensitivity of jet substructure to jet-induced medium response. *Physics Letters B*, 779, 409–413. doi:10.1016/j.physletb.2018.01.029
- Modak, T., Romão, J. C., Srivastava, R., Silva, J. P., & Sadhukhan, S. (2018). Probing wrong-sign hbb couplings in $\Upsilon \rightarrow \Upsilon \gamma$. In *XXII DAE High Energy Physics Symposium* (pp. 873–875). Springer International Publishing. doi:10.1007/978-3-319-73171-1_213
- Musha, T., & Pinheiro, M. J. (2018). General relativistic gravity machine using electromagneto-torsion field. *International Journal of Sciences*, 4(03), 15–23. doi:10.18483/ijsci.1562
- Nabais, F., Aslanyan, V., Borba, D. et al. (2018). TAE stability calculations compared to TAE antenna results in JET. *Nuclear Fusion*, 58(8), 082007. doi:10.1088/1741-4326/aabdbd
- Nikolaeva, V., Guimaraes, L., Manz, P. et al. (2018). Characterization of edge turbulence in different states of divertor detachment using reflectometry in the ASDEX Upgrade tokamak. *Plasma Physics and Controlled Fusion*, 60(5), 055009. doi:10.1088/1361-6587/aab4c5
- Ordikhani Seyedlar, A., Martins, J. P. de A., Sebastião. (2017). Dynamics of binary mixtures of an ionic liquid and ethanol by NMR. *Magnetic Resonance in Chemistry*, 56(2), 108–112. doi:10.1002/mrc.4620.
- Pathak, V. B., Kim, H. T., Vieira, J., Silva, L. O., & Nam, C. H. (2018). All optical dual stage laser wakefield acceleration driven by two-color laser pulses. *Scientific Reports*, 8(1). doi:10.1038/s41598-018-30095-4
- Pereira, R. C., Fernandes, A., Cruz, N. et al. (2018). Neutron/Gamma discrimination code based on trapezoidal filter. *Fusion Engineering and Design*, 134, 118–122. doi:10.1016/j.fusengdes.2018.07.002
- Pires, B. J., Silva, A. V., Moskaltsova, A., Deepak, F. L., Brogueira, P., Leitao, D. C., & Cardoso, S. (2018). Multilevel process on large area wafers for nanoscale devices. *Journal of Manufacturing Processes*, 32, 222–229. doi:10.1016/j.jmapro.2018.01.024
- Revel, A. et al. (2018). Strong Neutron Pairing in core+4n Nuclei. *Physical Review Letters*, 120(15). doi:10.1103/physrevlett.120.152504
- Ribeiro, G. et al. (2018). Structure of Be¹³ studied in proton knockout from B¹⁴. *Physical Review C*, 98(2). doi:10.1103/physrevc.98.024603
- Ribeiro, P., Neto, M., & Cardoso, S. (2018). Strategy for Determining a Magnet Position in a 2-D Space Using 1-D Sensors. *IEEE Transactions on Magnetics*, 54(11), 1–5. doi:10.1109/tmag.2018.2851928
- Richheimer, F., Costa, M., Leitao, D., Gaspar, J., Cardoso, S., & Freitas, P. (2018). 3D magnetic field reconstruction methodology based on a scanning magnetoresistive probe. *Sensors*, 18(7), 2049. doi:10.3390/s18072049
- Rodrigues, A. P., Santos, B., Carvalho, P. F., Correia, M., Sousa, J., Correia, C. M. B., & Gonçalves, B. (2018). Taking advantage of the intercommunication features of IPMCs in ATCA CDAQ systems. *Fusion Engineering and Design*, 128, 138–142. doi:10.1016/j.fusengdes.2018.01.069
- Rodrigues, J. D., Gonçalves, L. F., Terças, H., Marcassa, L. G., & Mendonça, J. T. (2018). Roton-induced trapping in strongly correlated Rydberg gases. *Physical Review A*, 98(6). doi:10.1103/physreva.98.062713
- Rodrigues, J. D., Terças, H., Gonçalves, L. F., Marcassa, L. G., & Mendonça, J. T. (2018). Emergence of spatial order in highly interacting Rydberg gases. *Physical Review A*, 97(2). doi:10.1103/physreva.97.022708

- Roman, M. et al. (2018). Dependence of Type Ia supernova luminosities on their local environment. *Astronomy and Astrophysics*, 615, A68. doi:10.1051/0004-6361/201731425
- Sacramento, P. D., & Vieira, V. R. (2018). Duality and topology. *Annals of Physics*, 391, 216–239. doi:10.1016/j.aop.2018.02.017
- Santos, B., Fernandes, A., Pereira, R. C. et al. (2018). Control and data acquisition software upgrade for JET gamma-ray diagnostics. *Fusion Engineering and Design*, 128, 117–121. doi:10.1016/j.fusengdes.2018.01.064
- Shaukat, M. I., Castro, E. V., & Terças, H. (2018). Entanglement sudden death and revival in quantum dark-soliton qubits. *Physical Review A*, 98(2). doi:10.1103/physreva.98.022319
- Silva, C., Hillesheim, J. C., Gil, L., Hidalgo, C., Meneses, L., & Rimini, F. (2018). Scaling of the geodesic acoustic mode amplitude on JET. *Plasma Physics and Controlled Fusion*, 60(8), 085006. doi:10.1088/1361-6587/aac980
- Silva, M., Leitao, D. C., Cardoso, S., & Freitas, P. (2018). MnNi-based spin valve sensors combining high thermal stability, small footprint and pTesla detectivities. *AIP Advances*, 8(5), 056644. doi:10.1063/1.5007668
- Silva, T., Grofulović, M., Klarenaar, B. L. M. et al. (2018). Kinetic study of low-temperature CO₂ plasmas under non-equilibrium conditions. I. Relaxation of vibrational energy. *Plasma Sources Science and Technology*, 27(1), 015019. doi:10.1088/1361-6595/aaa56a
- Silva, T., Grofulović, M., Terraz, L., Pintassilgo, C. D., & Guerra, V. (2018). Modelling the input and relaxation of vibrational energy in CO₂ plasmas. *Journal of Physics D: Applied Physics*, 51(46), 464001. doi:10.1088/1361-6463/aadbd7
- Sirunyan A. M. et al. (2018). Azimuthal anisotropy of charged particles with transverse momentum up to 100 GeV/c in PbPb collisions at s_{NN}=5.02 TeV. *Physics Letters B*, 776, 195–216. doi:10.1016/j.physletb.2017.11.041
- Sirunyan A. M. et al. (2018). Evidence for the Higgs boson decay to a bottom quark-antiquark pair. *Physics Letters B*, 780, 501–532. doi:10.1016/j.physletb.2018.02.050
- Sirunyan A. M. et al. (2018). Measurement of angular parameters from the decay B⁰ → K_s⁰μ⁺μ⁻ in proton–proton collisions at s=8TeV. *Physics Letters B*, 781, 517–541. doi:10.1016/j.physletb.2018.04.030
- Sirunyan A. M. et al. (2018). Measurement of quarkonium production cross sections in pp collisions at s=13TeV. *Physics Letters B*, 780, 251–272. doi:10.1016/j.physletb.2018.02.033
- Sirunyan A. M. et al. (2018). Measurement of the associated production of a single top quark and a Z boson in pp collisions at s=13TeV. *Physics Letters B*, 779, 358–384. doi:10.1016/j.physletb.2018.02.025
- Sirunyan A. M. et al. (2018). Measurements of tt⁻ cross sections in association with b jets and inclusive jets and their ratio using dilepton final states in pp collisions at s=13TeV. *Physics Letters B*, 776, 355–378. doi:10.1016/j.physletb.2017.11.043
- Sirunyan A. M. et al. (2018). Nuclear modification factor of D⁰ mesons in PbPb collisions at s_{NN}=5.02TeV. *Physics Letters B*, 782, 474–496. doi:10.1016/j.physletb.2018.05.074
- Sirunyan A. M. et al. (2018). Observation of the Higgs boson decay to a pair of τ leptons with the CMS detector. *Physics Letters B*, 779, 283–316. doi:10.1016/j.physletb.2018.02.004
- Sirunyan A. M. et al. (2018). Search for a massive resonance decaying to a pair of Higgs bosons in the four b quark final state in proton–proton collisions at s=13TeV. *Physics Letters B*, 781, 244–269. doi:10.1016/j.physletb.2018.03.084
- Sirunyan A. M. et al. (2018). Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state with two b quarks and two τ leptons in proton–proton collisions at s=13TeV. *Physics Letters B*, 785, 462–488. doi:10.1016/j.physletb.2018.08.057
- Sirunyan A. M. et al. (2018). Search for excited quarks of light and heavy flavor in γ + jet final states in proton–proton collisions at s=13TeV. *Physics Letters B*, 781, 390–411. doi:10.1016/j.physletb.2018.04.007
- Sirunyan A. M. et al. (2018). Search for gauge-mediated supersymmetry in events with at least one photon and missing transverse momentum in pp collisions at s=13TeV. *Physics Letters B*, 780, 118–143. doi:10.1016/j.physletb.2018.02.045
- Sirunyan A. M. et al. (2018). Search for heavy resonances decaying to a top quark and a bottom quark in the lepton + jets final state in proton–proton collisions at 13 TeV. *Physics Letters B*, 777, 39–63. doi:10.1016/j.physletb.2017.12.006
- Sirunyan A. M. et al. (2018). Search for Higgs boson pair production in events with two bottom quarks and two tau leptons in proton–proton collisions at s=13TeV. *Physics Letters B*, 778, 101–127. doi:10.1016/j.physletb.2018.01.001
- Sirunyan A. M. et al. (2018). Search for new long-lived particles at s=13 TeV. *Physics Letters B*, 780, 432–454. doi:10.1016/j.physletb.2018.03.019
- Sirunyan A. M. et al. (2018). Search for new physics in events with two soft oppositely charged leptons and missing transverse momentum in proton–proton collisions at s=13TeV. *Physics Letters B*, 782, 440–467. doi:10.1016/j.physletb.2018.05.062
- Sirunyan A. M. et al. (2018). Search for pair production of excited top quarks in the lepton + jets final state. *Physics Letters B*, 778, 349–370. doi:10.1016/j.physletb.2018.01.049
- Sirunyan A. M. et al. (2018). Search for pair production of vector-like quarks in the bW^bW channel from proton–proton collisions at s=13TeV. *Physics Letters B*, 779, 82–106. doi:10.1016/j.physletb.2018.01.077
- Sirunyan A. M. et al. (2018). Search for R-parity violating supersymmetry in pp collisions at s=13TeV using b jets in a final state with a single lepton, many jets, and high sum of large-radius jet masses. *Physics Letters B*, 783, 114–139. doi:10.1016/j.physletb.2018.06.028
- Sirunyan A. M. et al. (2018). Search for single production of a vector-like T quark decaying to a Z boson and a top quark in proton–proton collisions at s=13TeV. *Physics Letters B*, 781, 574–600. doi:10.1016/j.physletb.2018.04.036
- Sirunyan A. M. et al. (2018). Search for supersymmetry in events with one lepton and multiple jets exploiting the angular correlation between the lepton and the missing transverse momentum in proton–proton collisions at s=13TeV. *Physics Letters B*, 780, 384–409. doi:10.1016/j.physletb.2018.03.028
- Sirunyan A. M. et al. (2018). Search for supersymmetry with Higgs boson to diphoton decays using the razor variables at s=13TeV. *Physics Letters B*, 779, 166–190. doi:10.1016/j.physletb.2017.12.069
- Sirunyan A. M. et al. (2018). Search for the pair production of third-generation squarks with two-body decays to a bottom or charm quark and a neutralino in proton–proton collisions at s=13TeV. *Physics Letters B*, 778, 263–291. doi:10.1016/j.physletb.2018.01.012
- Sirunyan A. M. et al. (2018). Study of jet quenching with isolated-photon+jet correlations in PbPb and pp collisions at s_{NN}=5.02 TeV. *Physics Letters B*, 785, 14–39. doi:10.1016/j.physletb.2018.07.061
- Sirunyan, A. M. et al. (2018). Angular analysis of the decay B⁺→K⁺μ⁺μ⁻ in proton–proton collisions at s=8 TeV. *Physical Review D*, 98(11). doi:10.1103/physrevd.98.112011
- Sirunyan, A. M. et al. (2018). Azimuthal correlations for inclusive 2-jet, 3-jet, and 4-jet events in pp collisions at s=13 TeV. *The European Physical Journal C*, 78(7). doi:10.1140/epjc/s10052-018-6033-4
- Sirunyan, A. M. et al. (2018). Charged-particle nuclear modification factors in XeXe collisions at s_{NN} = 5.44 TeV. *Journal of High Energy Physics*, 2018(10). doi:10.1007/jhep10(2018)138
- Sirunyan, A. M. et al. (2018). Combined search for electroweak production of charginos and neutralinos in proton–proton collisions at s = 13 TeV. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)160.
- Sirunyan, A. M. et al. (2018). Comparing transverse momentum balance of b jet pairs in pp and PbPb collisions at s_{NN} = 5.02 TeV. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)160.

- nal of High Energy Physics, 2018(3). doi:10.1007/jhep03(2018)181.
- Sirunyan, A. M. et al. (2018). Constraining Gluon Distributions in Nuclei Using Dijets in Proton–proton and Proton–Lead Collisions at $\sqrt{s}=5.02$ TeV. *Physical Review Letters*, 121(6). doi:10.1103/physrevlett.121.062002
- Sirunyan, A. M. et al. (2018). Constraints on models of scalar and vector leptiquarks decaying to a quark and a neutrino at $\sqrt{s}=13$ TeV. *Physical Review D*, 98(3). doi:10.1103/physrevd.98.032005
- Sirunyan, A. M. et al. (2018). Constraints on the chiral magnetic effect using charge dependent azimuthal correlations in pPb and PbPb collisions at the CERN Large Hadron Collider. *Physical Review C*, 97(4). doi:10.1103/physrevc.97.044912
- Sirunyan, A. M. et al. (2018). Constraints on the double-parton scattering cross section from same-sign W boson pair production in proton–proton collisions at $\sqrt{s}=8$ TeV. *Journal of High Energy Physics*, 2018(2). doi:10.1007/jhep02(2018)032.
- Sirunyan, A. M. et al. (2018). Search for leptiquarks coupled to third-generation quarks in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 121(24). doi:10.1103/physrevlett.121.241802
- Sirunyan, A. M. et al. (2018). Electroweak production of two jets in association with a Z boson in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(7). doi:10.1140/epjc/s10052-018-6049-9
- Sirunyan, A. M. et al. (2018). Elliptic flow of charm and strange hadrons in high-multiplicity p+Pb collisions at $\sqrt{s}=8.16$ TeV. *Physical Review Letters*, 121(8). doi:10.1103/physrevlett.121.082301
- Sirunyan, A. M. et al. (2018). Erratum to: Measurement of b hadron lifetimes in pp collisions at $\sqrt{s}=8$ TeV. *The European Physical Journal C*, 78(7). doi:10.1140/epjc/s10052-018-6014-7
- Sirunyan, A. M. et al. (2018). Erratum to: Measurements of the $\sigma(\text{pp} \rightarrow \text{ZZ})$ production cross section and the $\text{BR}(Z \rightarrow 4\ell)$ branching fraction, and constraints on anomalous triple gauge couplings at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(6). doi:10.1140/epjc/s10052-018-5769-1
- Sirunyan, A. M. et al. (2018). Event shape variables measured using multijet final states in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(12). doi:10.1007/jhep12(2018)117
- Sirunyan, A. M. et al. (2018). Evidence for associated production of a Higgs boson with a top quark pair in final states with electrons, muons, and hadronically decaying τ leptons at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)066
- Sirunyan, A. M. et al. (2018). Evidence for the associated production of a single top quark and a photon in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 121(22). doi:10.1103/physrevlett.121.221802
- Sirunyan, A. M. et al. (2018). Identification of heavy-flavour jets with the CMS detector in pp collisions at 13 TeV. *Journal of Instrumentation*, 13(05), P05011. doi:10.1088/1748-0221/13/05/p05011
- Sirunyan, A. M. et al. (2018). Inclusive search for a highly boosted Higgs boson decaying to a bottom quark–antiquark pair. *Physical Review Letters*, 120(7). doi:10.1103/physrevlett.120.071802
- Sirunyan, A. M. et al. (2018). Jet properties in PbPb and pp collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)006.
- Sirunyan, A. M. et al. (2018). Measurement of associated Z + charm production in proton–proton collisions at $\sqrt{s}=8$ TeV. *The European Physical Journal C*, 78(4). doi:10.1140/epjc/s10052-018-5752-x
- Sirunyan, A. M. et al. (2018). Measurement of b hadron lifetimes in pp collisions at $\sqrt{s}=8$ TeV. *The European Physical Journal C*, 78(6). doi:10.1140/epjc/s10052-018-59293
- Sirunyan, A. M. et al. (2018). Measurement of charged particle spectra in minimum-bias events from proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6144-y
- Sirunyan, A. M. et al. (2018). Measurement of differential cross sections for the production of top quark pairs and of additional jets in lepton+jets events from pp collisions at $\sqrt{s}=13$ TeV. *Physical Review D*, 97(11). doi:10.1103/physrevd.97.112003
- Sirunyan, A. M. et al. (2018). Measurement of differential cross sections for Z boson production in association with jets in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(11). doi:10.1140/epjc/s10052-018-6373-0
- Sirunyan, A. M. et al. (2018). Measurement of differential cross sections in the kinematic angular variable φ^* for inclusive Z boson production in pp collisions at $\sqrt{s}=8$ TeV. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)172.
- Sirunyan, A. M. et al. (2018). Measurement of jet substructure observables in $t\bar{t}$ events from proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review D*, 98(9). doi:10.1103/physrevd.98.092014
- Sirunyan, A. M. et al. (2018). Measurement of normalized differential $t\bar{t}$ cross sections in the dilepton channel from pp collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(4). doi:10.1007/jhep04(2018)060.
- Sirunyan, A. M. et al. (2018). Measurement of prompt and nonprompt charmonium suppression in PbPb collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *The European Physical Journal C*, 78(6). doi:10.1140/epjc/s10052-018-5950-6
- Sirunyan, A. M. et al. (2018). Measurement of prompt D0 meson azimuthal anisotropy in Pb–Pb collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *Physical Review Letters*, 120(20). doi:10.1103/physrevlett.120.202301
- Sirunyan, A. M. et al. (2018). Measurement of the cross section for top quark pair production in association with a W or Z boson in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)011
- Sirunyan, A. M. et al. (2018). Measurement of the groomed jet mass in PbPb and pp collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *Journal of High Energy Physics*, 2018(10). doi:10.1007/jhep10(2018)161
- Sirunyan, A. M. et al. (2018). Measurement of the inclusive $t\bar{t}$ cross section in pp collisions at $\sqrt{s}=5.02$ TeV using final states with at least one charged lepton. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)115.
- Sirunyan, A. M. et al. (2018). Measurement of the inelastic proton–proton cross section at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(7). doi:10.1007/jhep07(2018)161
- Sirunyan, A. M. et al. (2018). Measurement of the production cross section for single top quarks in association with W bosons in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(10). doi:10.1007/jhep10(2018)117
- Sirunyan, A. M. et al. (2018). Measurement of the Splitting Function in pp and Pb–Pb collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *Physical Review Letters*, 120(14). doi:10.1103/physrevlett.120.142302
- Sirunyan, A. M. et al. (2018). Measurement of the top quark mass with lepton+jets final states using $\text{pp} \rightarrow \text{p} \text{p}$ collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(11). doi:10.1140/epjc/s10052-018-6332-9
- Sirunyan, A. M. et al. (2018). Measurement of the underlying event activity in inclusive Z boson production in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(7). doi:10.1007/jhep07(2018)032
- Sirunyan, A. M. et al. (2018). Measurement of the weak mixing angle using the forward-backward asymmetry of Drell–Yan events in pp collisions at 8 TeV. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6148-7

- Sirunyan, A. M. et al. (2018). Measurement of the $Z/\gamma^* \rightarrow \tau\tau$ cross section in pp collisions at $\sqrt{s}=13$ TeV and validation of τ lepton analysis techniques. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6146-9
- Sirunyan, A. M. et al. (2018). Measurement of the Λ_b polarization and angular parameters in $\Lambda_b \rightarrow J/\psi \Lambda$ decays from pp collisions at $\sqrt{s}=7$ and 8 TeV. *Physical Review D*, 97(7). doi:10.1103/physrevd.97.072010
- Sirunyan, A. M. et al. (2018). Measurements of differential cross sections of top quark pair production as a function of kinematic event variables in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)002
- Sirunyan, A. M. et al. (2018). Measurements of Higgs boson properties in the diphoton decay channel in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)185
- Sirunyan, A. M. et al. (2018). Measurements of the differential jet cross section as a function of the jet mass in dijet events from proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)113
- Sirunyan, A. M. et al. (2018). Measurements of the $\mathcal{B}(\text{pp} \rightarrow ZZ)$ production cross section and the $\mathcal{B}(Z \rightarrow 4\ell)$ branching fraction, and constraints on anomalous triple gauge couplings at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 78(2). doi:10.1140/epjc/s10052-018-5567-9
- Sirunyan, A. M. et al. (2018). Observation of complex time structures in the cosmic-ray electron and positron fluxes with the alpha magnetic spectrometer on the International Space Station. *Physical Review Letters*, 121(5). doi:10.1103/physrevlett.121.051102
- Sirunyan, A. M. et al. (2018). Observation of correlated azimuthal anisotropy Fourier harmonics in pp and p+Pb collisions at the LHC. *Physical Review Letters*, 120(9). doi:10.1103/physrevlett.120.092301
- Sirunyan, A. M. et al. (2018). Observation of electroweak production of same-sign W boson pairs in the two jet and two same-sign lepton final state in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 120(8). doi:10.1103/physrevlett.120.081801
- Sirunyan, A. M. et al. (2018). Observation of Higgs boson decay to bottom quarks. *Physical Review Letters*, 121(12). doi:10.1103/physrevlett.121.121801
- Sirunyan, A. M. et al. (2018). Observation of medium-induced modifications of jet fragmentation in Pb–Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV using isolated photon-tagged jets. *Physical Review Letters*, 121(24). doi:10.1103/physrevlett.121.242301
- Sirunyan, A. M. et al. (2018). Observation of proton-tagged, central (semi)exclusive production of high-mass lepton pairs in pp collisions at 13 TeV with the CMS-TOTEM precision proton spectrometer. *Journal of High Energy Physics*, 2018(7). doi:10.1007/jhep07(2018)153
- Sirunyan, A. M. et al. (2018). Observation of the $Z \rightarrow \phi_1 \phi_1^-$ Decay in pp Collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 121(14). doi:10.1103/physrevlett.121.141801
- Sirunyan, A. M. et al. (2018). Observation of the $\chi_{b1}(3P)$ and $\chi_{b2}(3P)$ and Measurement of their Masses. *Physical Review Letters*, 121(9). doi:10.1103/physrevlett.121.092002
- Sirunyan, A. M. et al. (2018). Observation of $t\bar{t}H$ Production. *Physical Review Letters*, 120(23). doi:10.1103/physrevlett.120.231801
- Sirunyan, A. M. et al. (2018). Performance of reconstruction and identification of τ leptons decaying to hadrons and $\nu\tau$ in pp collisions at $\sqrt{s}=13$ TeV. *Journal of Instrumentation*, 13(10), P10005–P10005. doi:10.1088/1748-0221/13/10/p10005
- Sirunyan, A. M. et al. (2018). Performance of the CMS muon detector and muon reconstruction with proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of Instrumentation*, 13(06), P06015–P06015. doi:10.1088/1748-0221/13/06/p06015
- Sirunyan, A. M. et al. (2018). Precision measurement of the structure of the CMS inner tracking system using nuclear interactions. *Journal of Instrumentation*, 13(10), P10034–P10034. doi:10.1088/1748-0221/13/10/p10034
- Sirunyan, A. M. et al. (2018). Pseudorapidity and transverse momentum dependence of flow harmonics in pPb and PbPb collisions. *Physical Review C*, 98(4). doi:10.1103/physrevc.98.044902
- Sirunyan, A. M. et al. (2018). Search for a charged Higgs boson decaying to charm and bottom quarks in proton–proton collisions at $\sqrt{s}=8$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)115
- Sirunyan, A. M. et al. (2018). Search for a heavy resonance decaying into a Z boson and a vector boson in the $\nu\bar{\nu}q\bar{q}$ final state. *Journal of High Energy Physics*, 2018(7). doi:10.1007/jhep07(2018)075
- Sirunyan, A. M. et al. (2018). Search for a heavy resonance decaying into a Z boson and a Z or W boson in $2l2q$ final states at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)101
- Sirunyan, A. M. et al. (2018). Search for a heavy resonance decaying to a pair of vector bosons in the lepton plus merged jet final state at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)088.
- Sirunyan, A. M. et al. (2018). Search for a heavy right-handed W boson and a heavy neutrino in events with two same-flavor leptons and two jets at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)148
- Sirunyan, A. M. et al. (2018). Search for a new scalar resonance decaying to a pair of Z bosons in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)127
- Sirunyan, A. M. et al. (2018). Search for a singly produced third-generation scalar leptoquark decaying to a τ lepton and a bottom quark in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(7). doi:10.1007/jhep07(2018)115
- Sirunyan, A. M. et al. (2018). Search for additional neutral MSSM Higgs bosons in the $\tau\tau$ final state in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)007
- Sirunyan, A. M. et al. (2018). Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state of two muons and two τ leptons in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)018
- Sirunyan, A. M. et al. (2018). Search for beyond the standard model Higgs bosons decaying into a $b\bar{b}$ pair in pp collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)113
- Sirunyan, A. M. et al. (2018). Search for black holes and sphalerons in high-multiplicity final states in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)042
- Sirunyan, A. M. et al. (2018). Search for dark matter in events with energetic, hadronically decaying top quarks and missing transverse momentum at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)027
- Sirunyan, A. M. et al. (2018). Search for dark matter produced in association with a Higgs boson decaying to $\gamma\gamma$ or $\tau^+\tau^-$ at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)046
- Sirunyan, A. M. et al. (2018). Search for decays of stopped exotic long-lived particles produced in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)127.
- Sirunyan, A. M. et al. (2018). Search for disappearing tracks as a signature of new long-lived particles in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)016
- Sirunyan, A. M. et al. (2018). Search for electroweak production of charginos and neutralinos in multilepton final states in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)042

- nal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)166.
- Sirunyan, A. M. et al. (2018). Search for heavy neutral leptons in events with three charged leptons in proton–proton collisions at $s=13$ TeV. *Physical Review Letters*, 120(22). doi:10.1103/physrevlett.120.221801
- Sirunyan, A. M. et al. (2018). Search for heavy resonances decaying into a vector boson and a Higgs boson in final states with charged leptons, neutrinos and b quarks at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)172
- Sirunyan, A. M. et al. (2018). Search for Higgsino pair production in pp collisions at $s=13$ TeV in final states with large missing transverse momentum and two Higgs bosons decaying via $H \rightarrow b\bar{b}$. *Physical Review D*, 97(3). doi:10.1103/physrevd.97.032007
- Sirunyan, A. M. et al. (2018). Search for high-mass resonances in dilepton final states in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)120
- Sirunyan, A. M. et al. (2018). Search for high-mass resonances in final states with a lepton and missing transverse momentum at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)128
- Sirunyan, A. M. et al. (2018). Search for lepton flavour violating decays of the Higgs boson to $\mu\tau$ and $e\tau$ in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)001
- Sirunyan, A. M. et al. (2018). Search for lepton-flavor violating decays of heavy resonances and quantum black holes to $e\mu$ final states in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(4). doi:10.1007/jhep04(2018)073.
- Sirunyan, A. M. et al. (2018). Search for long-lived particles with displaced vertices in multi-jet events in proton–proton collisions at $s=13$ TeV. *Physical Review D*, 98(9). doi:10.1103/physrevd.98.092011
- Sirunyan, A. M. et al. (2018). Search for low mass vector resonances decaying into quark-antiquark pairs in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(1). doi:10.1007/jhep01(2018)097.
- Sirunyan, A. M. et al. (2018). Search for massive resonances decaying into WW, WZ, ZZ, qW, and qZ with dijet final states at $s=13$ TeV. *Physical Review D*, 97(7). doi:10.1103/physrevd.97.072006
- Sirunyan, A. M. et al. (2018). Search for narrow and broad dijet resonances in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV and constraints on dark matter mediators and other new particles. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)130
- Sirunyan, A. M. et al. (2018). Search for narrow resonances in the b-tagged dijet mass spectrum in proton–proton collisions at $s=8$ TeV. *Physical Review Letters*, 120(20). doi:10.1103/physrevlett.120.201801
- Sirunyan, A. M. et al. (2018). Search for natural and split supersymmetry in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV in final states with jets and missing transverse momentum. *Journal of High Energy Physics*, 2018(5). doi:10.1007/jhep05(2018)025
- Sirunyan, A. M. et al. (2018). Search for natural supersymmetry in events with top quark pairs and photons in pp collisions at $s = 8 \sqrt{s}=8$ TeV. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)167.
- Sirunyan, A. M. et al. (2018). Search for new phenomena in final states with two opposite-charge, same-flavor leptons, jets, and missing transverse momentum in pp collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)076
- Sirunyan, A. M. et al. (2018). Search for new physics in dijet angular distributions using proton–proton collisions at root $s=13$ TeV and constraints on dark matter and other models. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6242-x
- Sirunyan, A. M. et al. (2018). Search for new physics in final states with an energetic jet or a hadronically decaying W or Z boson and transverse momentum imbalance at $s=13$ TeV. *Physical Review D*, 97(9). doi:10.1103/physrevd.97.092005
- Sirunyan, A. M. et al. (2018). Search for pair-produced resonances decaying to quark pairs in proton–proton collisions at $s=13$ TeV. *Physical Review D*, 98(11). doi:10.1103/physrevd.98.112014
- Sirunyan, A. M. et al. (2018). Search for pair-produced resonances each decaying into at least four quarks in proton–proton collisions at $s=13$ TeV. *Physical Review Letters*, 121(14). doi:10.1103/physrevlett.121.141802
- Sirunyan, A. M. et al. (2018). Search for physics beyond the standard model in events with high-momentum Higgs bosons and missing transverse momentum in proton–proton collisions at 13 TeV. *Physical Review Letters*, 120(24). doi:10.1103/physrevlett.120.241801
- Sirunyan, A. M. et al. (2018). Search for physics beyond the standard model in high-mass diphoton events from proton–proton collisions at $s=13$ TeV. *Physical Review D*, 98(9). doi:10.1103/physrevd.98.092001
- Sirunyan, A. M. et al. (2018). Search for resonances in the mass spectrum of muon pairs produced in association with b quark jets in proton–proton collisions at $s = 8 \sqrt{s}=8$ and 13 TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)161
- Sirunyan, A. M. et al. (2018). Search for resonant pair production of Higgs bosons decaying to bottom quark-antiquark pairs in proton–proton collisions at 13 TeV. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)152
- Sirunyan, A. M. et al. (2018). Search for single production of vector-like quarks decaying to a b quark and a Higgs boson. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)031
- Sirunyan, A. M. et al. (2018). Search for standard model production of four top quarks with same-sign and multilepton final states in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 78(2). doi:10.1140/epjc/s10052-018-5607-5
- Sirunyan, A. M. et al. (2018). Search for supersymmetry in events with a τ lepton pair and missing transverse momentum in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)151
- Sirunyan, A. M. et al. (2018). Search for supersymmetry in events with at least three electrons or muons, jets, and missing transverse momentum in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(2). doi:10.1007/jhep02(2018)067
- Sirunyan, A. M. et al. (2018). Search for supersymmetry in proton–proton collisions at 13 TeV using identified top quarks. *Physical Review D*, 97(1). doi:10.1103/physrevd.97.012007
- Sirunyan, A. M. et al. (2018). Search for $t\bar{t}\overline{\text{H}}\text{H}$ production in the all-jet final state in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)101
- Sirunyan, A. M. et al. (2018). Search for the decay of a Higgs boson in the $l\bar{l}\gamma$ channel in proton–proton collisions at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)152
- Sirunyan, A. M. et al. (2018). Search for the flavor-changing neutral current interactions of the top quark and the Higgs boson which decays into a pair of b quarks at $s = 13 \sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2018(6). doi:10.1007/jhep06(2018)102
- Sirunyan, A. M. et al. (2018). Search for the X(5568) state decaying into $B_s0\pi^\pm$ in proton–proton collisions at $s=8$ TeV. *Physical Review Letters*, 120(20). doi:10.1103/physrevlett.120.202005
- Sirunyan, A. M. et al. (2018). Search for third-generation scalar leptoquarks decaying to a top quark and a tau lepton at root $s=13$ TeV. *The European Physical Journal C*, 78(9). doi:10.1140/epjc/s10052-018-6143-z
- Sirunyan, A. M. et al. (2018). Search for top squarks and dark matter particles in opposite-charge dilepton final states at $s=13$ TeV. *Physical Review D*, 97(3). doi:10.1103/physrevd.97.032009

- Sirunyan, A. M. et al. (2018). Search for top squarks decaying via four-body or chargino-mediated modes in single-lepton final states in proton–proton collisions at $s = 13 \sqrt{s} = 13 \text{ TeV}$. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)065
- Sirunyan, A. M. et al. (2018). Search for vector-like light-flavor quark partners in proton–proton collisions at $s = 8 \text{ TeV}$. *Physical Review D*, 97(7). doi:10.1103/physrevd.97.072008
- Sirunyan, A. M. et al. (2018). Search for vector-like T and B quark pairs in final states with leptons at $s = 13 \sqrt{s} = 13 \text{ TeV}$. *Journal of High Energy Physics*, 2018(8). doi:10.1007/jhep08(2018)177
- Sirunyan, A. M. et al. (2018). Search for ZZ resonances in the $2l2\nu$ final state in proton–proton collisions at 13 TeV . *Journal of High Energy Physics*, 2018(3). doi:10.1007/jhep03(2018)003.
- Sirunyan, A. M. et al. (2018). Search for $Z\gamma$ resonances using leptonic and hadronic final states in proton–proton collisions at $s = 13 \sqrt{s} = 13 \text{ TeV}$. *Journal of High Energy Physics*, 2018(9). doi:10.1007/jhep09(2018)148
- Sirunyan, A. M. et al. (2018). Searches for pair production of charginos and top squarks in final states with two oppositely charged leptons in proton–proton collisions at $s = 13 \sqrt{s} = 13 \text{ TeV}$. *Journal of High Energy Physics*, 2018(11). doi:10.1007/jhep11(2018)079
- Sirunyan, A. M. et al. (2018). Studies of $\mathcal{B}^*_{(s)}(5840) \rightarrow \mathcal{B}^*_{(s)}(5830) + \mathcal{K}^*_0(896) \rightarrow \mathcal{B}^*_{(s)}(5840) + \mathcal{K}^*_0(896)$ mesons including the observation of the $\mathcal{B}^*_{(s)}(5840) \rightarrow \mathcal{B}^*_{(s)}(5830) + \mathcal{K}^*_0(896)$ decay in proton–proton collisions at $\sqrt{s} = 8 \text{ TeV}$. *The European Physical Journal C*, 78(11). doi:10.1140/epjc/s10052-018-6390-z
- Sirunyan, A. M. et al. (2018). Study of dijet events with a large rapidity gap between the two leading jets in pp collisions at $\sqrt{s} = 7 \text{ TeV}$. *The European Physical Journal C*, 78(3). doi:10.1140/epjc/s10052-018-5691-6
- Sirunyan, A. M. et al. (2018). Suppression of excited Υ states relative to the ground state in Pb–Pb collisions at $\sqrt{s_{NN}} = 5.02 \text{ TeV}$. *Physical Review Letters*, 120(14). doi:10.1103/physrevlett.120.142301
- Sirunyan, A. M. et al. (2019). (2019). Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in proton–proton collisions at $s = 13 \sqrt{s} = 13 \text{ TeV}$. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)154.
- Sirunyan, A. M., et al. (2018). Pseudorapidity distributions of charged hadrons in proton–lead collisions at $\sqrt{s_{NN}} = 5.02 \text{ TeV}$ and 8.16 TeV . *Journal of High Energy Physics*, 2018(1). doi:10.1007/jhep01(2018)045.
- Stadler, A., Leitão, S., Peña, M. T., & Biernat, E. P. (2018). Heavy and heavy-light mesons in the covariant spectator theory. *Few-Body Systems*, 59(3). doi:10.1007/s00601-018-1355-1
- Sternbeck, A., Leutnant, M., & Eichmann, G. (2019, May 29). Towards lattice-assisted hadron physics calculations based on QCD n-point functions. Proceedings of The 36th Annual International Symposium on Lattice Field Theory – PoS(LATTICE2018). *The 36th Annual International Symposium on Lattice Field Theory*. doi:10.22323/1.334.0068
- Tavares, M. I. B., da Silva, E. O., Silva, P. S. R. C., & Sebastião, P. J. (2018). The use of fast field cycling to evaluate the time domain relaxation of starches from tropical fruit seeds. *Molecular Physics*, 117(7–8), 1028–1033. doi:10.1080/00268976.2018.1540803
- Terças, H., Rodrigues, J. D., & Mendonça, J. T. (2018). Axion-plasmon polaritons in strongly magnetized plasmas. *Physical Review Letters*, 120(18). doi:10.1103/physrevlett.120.181803
- Tomassetti, N., Barão, F., Bertucci, B., Fiandrini, E., Figueiredo, J. L., Lousada, J. B., & Orcinha, M. (2018). Testing diffusion of cosmic rays in the heliosphere with proton and helium data from AMS. *Physical Review Letters*, 121(25). doi:10.1103/physrevlett.121.251104
- Torres Alonso, E. et al. (2018). Graphene electronic fibres with touch-sensing and light-emitting functionalities for smart textiles. *Npj Flexible Electronics*, 2(1). doi:10.1038/s41528-018-0040-2
- Tsang, K. W., Rollier, M., Ghosh, A., Samajdar, A., Agathos, M., Chatziioannou, K., Cardoso, V., Khanna, G., & Van Den Broeck, C. (2018). A morphology-independent data analysis method for detecting and characterizing gravitational wave echoes. *Physical Review D*, 98(2). doi:10.1103/physrevd.98.024023
- Uguz, S. S., Ozvural, E. B., Beira, M. J., Oztop, M. H., & Sebastião, P. J. (2018). Use of NMR Relaxometry to identify frankfurters of different meat sources. *Molecular Physics*, 117(7–8), 1015–1019. doi:10.1080/00268976.2018.1542162
- Vargas, J. F., Lopez, B., Panesi, M., & Lino Da Silva, M. (2018). Refitting of detailed CO2IR databases to vibrationally specific databases tailored for aerothermodynamic flows. *2018 Joint Thermophysics and Heat Transfer Conference*. doi:10.2514/6.2018-4177
- Vicente, J., da Silva, F., Heurax, S., Conway, G. D., Silva, C., & Ribeiro, T. (2018). Turbulence level effects on conventional reflectometry using 2D full-wave simulations. *Review of Scientific Instruments*, 89(10), 10H110. doi:10.1063/1.5038756
- Vicente, R., Cardoso, V., & Lopes, J. C. (2018). Penrose process, superradiance, and ergoregion instabilities. *Physical Review D*, 97(8). doi:10.1103/physrevd.97.084032
- Vranic, M., Fonseca, R. A., & Silva, L. O. (2018). Extremely intense laser-based electron acceleration in a plasma channel. *Plasma Physics and Controlled Fusion*, 60(3), 034002. doi:10.1088/1361-6587/aaa36c
- Wang, Z.-H., Castro, E. V., & Lin, H.-Q. (2018). Strain manipulation of Majorana fermions in graphene armchair nanoribbons. *Physical Review B*, 97(4). doi:10.1103/physrevb.97.041414
- Williams, G. O. et al. (2018). Tracking the ultrafast XUV optical properties of x-ray free-electron-laser heated matter with high-order harmonics. *Physical Review A*, 97(2). doi:10.1103/physreva.97.023414
- Aab, A. et al. (2018). Observation of inclined EeV air showers with the radio detector of the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, 2018(10), 026–026. doi:10.1088/1475-7516/2018/10/026
- Aab, A. et al. (2019). Data-driven estimation of the invisible energy of cosmic ray showers with the Pierre Auger Observatory. *Physical Review D*, 100(8). doi:10.1103/physrevd.100.082003
- Aab, A. et al. (2019). Limits on point-like sources of ultra-high-energy neutrinos with the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, 2019(11), 004–004. doi:10.1088/1475-7516/2019/11/004
- Aab, A. et al. (2019). Measurement of the average shape of longitudinal profiles of cosmic-ray air showers at the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, 2019(03), 018–018. doi:10.1088/1475-7516/2019/03/018
- Aab, A. et al. (2019). Probing the origin of ultra-high-energy cosmic rays with neutrinos in the EeV energy range using the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, 2019(10), 022–022. doi:10.1088/1475-7516/2019/10/022
- Aab, A., Abreu, P., Aglietta, M. et al. (2018). An Indication of anisotropy in arrival directions of ultra-high-energy cosmic rays through comparison to the flux pattern of extragalactic gamma-ray sources. *The Astrophysical Journal*, 853(2), L29. doi:10.3847/2041-8213/aaa66d
- Aaboud, M. et al. (2019). Combinations of single-top-quark production cross-section measurements and $|f_{LVVtb}|$ determinations at $\sqrt{s} = 7$ and 8 TeV with the ATLAS and CMS experiments. *Journal of High Energy Physics*, 2019(5). doi:10.1007/jhep05(2019)088
- Aaboud, M. et al. (2019). Search for long-lived particles in final states with displaced dimuon vertices in pp collisions at $s = 13 \text{ TeV}$ with the ATLAS detector. *Physical Review D*, 99(1). doi:10.1103/physrevd.99.012001

- Abada, A. et al. (2019). FCC Physics Opportunities. *The European Physical Journal C*, 79(6). doi:10.1140/epjc/s10052-019-6904-3
- Abada, A. et al. (2019). FCC-ee: The Lepton Collider. *The European Physical Journal Special Topics*, 228(2), 261–623. doi:10.1140/epjst/e2019-900045-4
- Abada, A. et al. (2019). FCC-hh: The Hadron Collider. *The European Physical Journal Special Topics*, 228(4), 755–1107. doi:10.1140/epjst/e2019-900087-0
- Abada, A. et al. (2019). HE-LHC: The High-Energy Large Hadron Collider. *The European Physical Journal Special Topics*, 228(5), 1109–1382. doi:10.1140/epjst/e2019-900088-6
- Acciari, V. A. et al. (2019). Deep observations of the globular cluster M15 with the MAGIC telescopes. *Monthly Notices of the Royal Astronomical Society*, 484(2), 2876–2885. doi:10.1093/mnras/stz179
- Acciari, V. A. et al. (2019). Measurement of the extragalactic background light using MAGIC and Fermi-LAT gamma-ray observations of blazars up to $z = 1$. *Monthly Notices of the Royal Astronomical Society*, 486(3), 4233–4251. doi:10.1093/mnras/stz943
- Adamczewski-Musch, J. et al. (2019). Identical pion intensity interferometry in central Au + Au collisions at 1.23A GeV. *Physics Letters B*, 795, 446–451. doi:10.1016/j.physletb.2019.06.047
- Aguilar, M. et al. (2019). Towards understanding the origin of cosmic-ray electrons. *Physical Review Letters*, 122(10). doi:10.1103/physrevlett.122.101101
- Aguilar, M. et al. (2019). Towards understanding the origin of cosmic-ray positrons. *Physical review letters*, 122(4). Doi:10.1103/physrevlett.122.041102
- Ahnen, M. L. et al. (2020). Statistics of VHE γ -rays in temporal association with radio giant pulses from the Crab pulsar. *Astronomy & Astrophysics*, 634, A25. doi:10.1051/0004-6361/201833555
- Akhunzyanov, R. et al. (2019). Transverse extension of partons in the proton probed in the sea-quark range by measuring the DVCS cross section. *Physics Letters B*, 793, 188–194. doi:10.1016/j.physletb.2019.04.038
- Albuquerque, D. C., Martins, V. C., & Cardoso, S. (2019). Magnetoresistive detection of clinical biomarker for monitoring of colorectal cancer. *IEEE Magnetics Letters*, 10, 1–5. doi:10.1109/Imag.2019.2951339
- Alexeev, M. G. et al. (2019). Measurement of P-weighted Sivers asymmetries in lepton production of hadrons. *Nuclear Physics B*, 940, 34–53. doi:10.1016/j.nuclphysb.2018.12.024
- Aluculesei, A., Cachitas, H., Carvalho, J., Vaca Chavez, F., Figueirinhas, J. L., Sebastião, P. J., Cruz, C., Tamba, M. G., Kohlmeier, A., & Mehl, G. H. (2019). 1H NMR study of molecular order and dynamics in the liquid crystal CB-C9-CB. *Physical Chemistry Chemical Physics*, 21(8), 4523–4537. doi:10.1039/c8cp06868b
- Amin, S. T., Mera, B., Paunković, N., & Vieira, V. R. (2019). Information geometric analysis of long range topological superconductors. *Journal of Physics: Condensed Matter*, 31(48), 485402. doi:10.1088/1361-648x/ab3c70
- Anderson, M. et al. (2019). Search for invisible modes of nucleon decay in water with the SNO+ detector. *Physical Review D*, 99(3). doi:10.1103/physrevd.99.032008
- Anderson, M., Andringa, S., Asahi, S. et al. (2019). Measurement of the B8 solar neutrino flux in SNO+ with very low backgrounds. *Physical Review D*, 99(1). doi:10.1103/physrevd.99.012012
- Annulli, L., Cardoso, V., & Gualtieri, L. (2019). Electromagnetism and hidden vector fields in modified gravity theories: Spontaneous and induced vectorization. *Physical Review D*, 99(4). doi:10.1103/physrevd.99.044038
- Apolinário, L., Milhano, G., Salgado, C. A., & Salam, G. (2019). Unveiling the yoctosecond structure of the QGP with top quarks. *Nuclear Physics A*, 982, 795–798. doi:10.1016/j.nuclphysa.2018.11.014
- Assunção, F., Correia, J., Conceição, R., Pimenta, M. J. M., Tomé, B., Lourenço, N., & Machado, P. (2019). Automatic design of artificial neural networks for gamma-ray detection. *IEEE Access*, 7, 110531–110540. doi:10.1109/access.2019.2933947
- Ayllon, R., Terças, H., & Mendonça, J. T. (2019). Electron trapping in freely expanding ultracold neutral plasmas. *Physics of Plasmas*, 26(3), 033501. doi:10.1063/1.5064445
- Barack, L., Cardoso, V., Nissanke, S. et al. (2019). Black holes, gravitational waves and fundamental physics: a roadmap. *Classical and Quantum Gravity*, 36(14), 143001. doi:10.1088/1361-6382/ab0587
- Barreiros, D. M., Felipe, R. G., & Joaquim, F. R. (2018). Minimal type-I seesaw model with maximally restricted texture zeros. *Physical Review D*, 97(11). doi:10.1103/physrevd.97.115016
- Barreiros, D. M., Felipe, R. G., & Joaquim, F. R. (2019). Combining texture zeros with a remnant CP symmetry in the minimal type-I seesaw. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)223
- Barrocas, B., Monteiro, O. C., Nunes, M. R., & Silvestre, A. J. (2019). Influence of Re and Ru doping on the structural, optical and photocatalytic properties of nanocrystalline TiO₂. *SN Applied Sciences*, 1(6). doi:10.1007/s42452-019-0567-4
- Bernard, L., Cardoso, V., Ikeda, T., & Zilhão, M. (2019). Physics of black hole binaries: Geodesics, relaxation modes, and energy extraction. *Physical Review D*, 100(4). doi:10.1103/physrevd.100.044002
- Bicudo, P., Cardoso, M., Cardoso, N., & Wagner, M. (2020). Bottomonium resonances with $I=0$ from lattice QCD correlation functions with static and light quarks. *Physical Review D*, 101(3). doi:10.1103/physrevd.101.034503
- Bicudo, P., Cardoso, N., & Cardoso, M. (2019). Pure gauge flux tubes and their widths at finite temperature. *Nuclear Physics B*, 940, 88–112. doi:10.1016/j.nuclphysb.2019.01.012
- Biel, W., Albanese, R., Ambrosino, R. et al. (2019). Diagnostics for plasma control – From ITER to DEMO. *Fusion Engineering and Design*, 146, 465–472. doi:10.1016/j.fusengdes.2018.12.092
- Bošković, M., Brito, R., Cardoso, V., Ikeda, T., & Witek, H. (2019). Axionic instabilities and new black hole solutions. *Physical Review D*, 99(3). doi:10.1103/physrevd.99.035006
- Čadež, T., Mondaini, R., Castro, E. V., & Sacramento, P. D. (2019). Static and dynamic disorder in topological systems: localized, critical and extended states. *Acta Physica Polonica A*, 135(6), 1180–1190. doi:10.12693/aphyspola.135.1180
- Čadež, T., Mondaini, R., & Sacramento, P. D. (2019). Edge and bulk localization of Floquet topological superconductors. *Physical Review B*, 99(1). doi:10.1103/physrevb.99.014301
- Caetano, D. M. et al. (2019). High-resolution non-destructive test probes based on magnetoresistive sensors. *IEEE Transactions on Industrial Electronics*, 66(9), 7326–7337. doi:10.1109/tie.2018.2879306
- Cardoso, J. P., Mendes, L. F., & Mendes, J. F. (2019). HeatTracer – A novel Monte Carlo radiative heat transfer tool for cavity receivers simulation. *SOLARPACES 2018: International Conference on Concentrating Solar Power and Chemical Energy Systems*. doi:10.1063/1.5117673
- Cardoso, V., del Río, A., & Kimura, M. (2019). Distinguishing black holes from horizonless objects through the excitation of resonances during inspiral. *Physical Review D*, 100(8). doi:10.1103/physrevd.100.084046
- Cardoso, V., Gualtieri, L., & Moore, C. J. (2019). Gravitational waves and higher dimensions: Love numbers and Kaluza-Klein excitations. *Physical Review D*, 100(12). doi:10.1103/physrevd.100.124037
- Cardoso, V., Kimura, M., Maselli, A., Berti, E., Macedo, C. F. B., & McManus, R. (2019). Parametrized black hole quasinormal ringdown: Decoupled equations for nonrotating black holes. *Physical Review D*, 99(10). doi:10.1103/physrevd.99.104077
- Cardoso, V., & Pani, P. (2019). Testing the nature of dark compact objects: a status report. *Living Reviews in Relativity*, 22(1). doi:10.1007/s41114-019-0020-4
- Cardoso, V., & Vicente, R. (2019). Moving black holes: Energy extraction, absorption cross section, and the ring of fire. *Physical Review D*, 100(8). doi:10.1103/physrevd.100.084001

- Carvalho, J., Cruz, C., Figueirinhas, J. L., Tamba, M. G., Kohlmeier, A., & Mehl, G. H. (2019). Proton and deuterium NMR study of the CBC9 CB dimer system. *The Journal of Physical Chemistry B*, 123(6), 1442–1451. doi:10.1021/acs.jpcc.8b11526
- Santos Fernandes, L., Lopez, B., and Lino da Silva, M. Computational fluid radiative dynamics of the Galileo Jupiter entry a *Physics of Fluids* 31, 106104 (2019) 10.1063/1.5115264
- Correia, M., Sousa, J., Rodrigues, A. P., Carvalho, P. F., Santos, B., Combo, A., Correia, C. M. B. A., & Goncalves, B. (2019). PCIe hot-plug support standardization challenges in ATCA. *IEEE Transactions on Nuclear Science*, 66(10), 2282–2285. doi:10.1109/tns.2019.2937367
- Correia, S. S., Felipe, R. G., & Joaquim, F. R. (2019). Dirac neutrinos in the 2HDM with restrictive Abelian symmetries. *Physical Review D*, 100(11). doi:10.1103/physrevd.100.115008
- Crespo, R., Cravo, E., & Deltuva, A. (2019). Three-body calculations for (p,pN) reactions: Kinematically inclusive, semi-inclusive, and fully exclusive cross sections. *Physical Review C*, 99(5). doi:10.1103/physrevc.99.054622
- Diab, B. for the CMS collaboration (2019). Fragmentation of J/ψ in jets in pp collisions at $s=5.02\text{TeV}$. *Nuclear Physics A*, 982, 186–188. doi:10.1016/j.nuclphysa.2018.09.049
- Dilão, R., & Mota, B. (2019). The transcriptional regulation of PER protein in drosophila. *Journal of Theoretical Biology*, 469, 12–17. doi:10.1016/j.jtbi.2019.02.022
- Dominguez, F., Milhano, J. G., Salgado, C. A., Tywoniuk, K., & Vila, V. (2019). Coherence effects in multiple medium-induced radiation. *Proceedings, Hot Quarks 2018 — Workshop for Young Scientists on the Physics of Ultrarelativistic Nucleus-Nucleus Collisions* 10(1), 11. doi:10.3390/proceedings2019010011
- Drenik, A., Brezinsek, S., Carvalho, P., Huber, V., Osterman, N., Matthews, G. F., & Nemeč, M. (2019). Analysis of the outer divertor hot spot activity in the protection video camera recordings at JET. *Fusion Engineering and Design*, 139, 115–123. doi:10.1016/j.fusengdes.2018.12.079
- Duarte, J. et al. (2019). Computed stereo lensless X-ray imaging. *Nature Photonics*, 13(7), 449–453. doi:10.1038/s41566-019-0419-1
- d'Enterria, D. for the CMS Collaboration (2019). Evidence for light-by-light scattering in ultraperipheral PbPb collisions at $s_{NN}=5.02\text{TeV}$. *Nuclear Physics A*, 982, 791–794. doi:10.1016/j.nuclphysa.2018.10.018
- Echeverria, C., Almeida, P. L., Figueirinhas, J. L., & Godinho, M. H. (2019). Understanding the influence of carbon nanotubes on the flow behavior of liquid crystalline hydroxypropylcellulose: A Rheo-NMR study. *Polymer*, 180, 121675. doi:10.1016/j.polymer.2019.121675
- Eichmann, G., Duarte, P., Peña, M. T., & Stadler, A. (2019). Scattering amplitudes and contour deformations. *Physical Review D*, 100(9). doi:10.1103/physrevd.100.094001
- Fernandes, A., Cruz, N., Santos, B. et al. (2019). FPGA code for the data acquisition and real-time processing prototype of the ITER radial neutron Camera. *IEEE Transactions on Nuclear Science*, 66(7), 1318–1323. doi:10.1109/tns.2019.2903646
- Ferreira, J. S., & Ribeiro, P. (2019). Lipkin-Meshkov-Glick model with Markovian dissipation: A description of a collective spin on a metallic surface. *Physical Review B*, 100(18). doi:10.1103/physrevb.100.184422
- Figueira, G., Braga, L., Ahmed, S., Boyle, A., Galimberti, M., Galletti, M., & Oliveira, P. (2019). Simultaneous measurement of pulse front tilt and pulse duration with a double trace autocorrelator. *Journal of the Optical Society of America B*, 36(2), 366. doi:10.1364/josab.36.000366
- Fonseca, J., & Dilão, R. (2018). Dynamic guidance of orbiter gliders: alignment, final approach, and landing. *CEAS Space Journal*, 11(2), 123–145. doi:10.1007/s12567-018-0219-3
- Fontes, D., Romão, J. C., & Valle, J. W. F. (2019). Electroweak breaking and Higgs boson profile in the simplest linear seesaw model. *Journal of High Energy Physics*, 2019(10). doi:10.1007/jhep10(2019)245
- Franco, F., Cardoso, S., & Freitas, P. P. (2019). Reconfigurable spintronics wheatstone bridge sensors with offset voltage compensation at wafer level. *IEEE Transactions on Magnetics*, 55(7), 1–5. doi:10.1109/tmag.2019.2896379
- Franco, F., Dias, R. A., Gaspar, J., de Freitas, S. C., & Freitas, P. P. (2019). Hybrid rigid-flexible magnetoresistive device based on a wafer level packaging technology for micrometric proximity measurements. *IEEE Sensors Journal*, 19(24), 12363–12368. doi:10.1109/jsen.2019.2938368
- Galletti, M., Pires, H., Hariton, V., João, C. P., Künzel, S., Galimberti, M., & Figueira, G. (2019). High efficiency second harmonic generation of nanojoule-level femtosecond pulses in the visible based on BiBO. *High Power Laser Science and Engineering*, 7. doi:10.1017/hpl.2018.72
- Gonçalves, M., Ribeiro, P., Mondaini, R., & Castro, E. V. (2019). Temperature-driven gapless topological insulator. *Physical Review Letters*, 122(12). doi:10.1103/physrevlett.122.126601
- Gonçalves, P. M., Lino da Silva, M., dos Reis, R. J. N., & da Silva, C. R. I. (2019). Hypersonic transatmospheric and exoatmospheric vehicle design using the SUAVE tool. *CEAS Space Journal*, 12(2), 171–190. doi:10.1007/s12567-019-00283-7
- Gottardo, A. et al. (2019). New spectroscopic information on $Tl_{211,213}$: A changing structure beyond the $N=126$ shell closure. *Physical Review C*, 99(5). doi:10.1103/physrevc.99.054326
- Guerra, V., Tejero-del-Caz, A., Pintassilgo, C. D., & Alves, L. L. (2019). Modelling N_2-O_2 plasmas: volume and surface kinetics. *Plasma Sources Science and Technology*, 28(7), 073001. doi:10.1088/1361-6595/ab252c
- Guimaraes, L., Silva, C., Bernert, M. et al. (2019). Link between divertor conditions and high-field-side/low-field-side midplane density profiles in H-mode plasmas at ASDEX Upgrade. *Nuclear Fusion*, 59(12), 126041. doi:10.1088/1741-4326/ab431b
- Harada, T., Cardoso, V., & Miyata, D. (2019). Particle creation in gravitational collapse to a horizonless compact object. *Physical Review D*, 99(4). doi:10.1103/physrevd.99.044039
- Hatano, Y., Lee, S. E., Likonen, J., Koivuranta, S., Hara, M., Masuzaki, S., Asakura, N., Isobe, K., Hayashi, T., Ikonen, J., & Widdowson, A. (2019). Tritium distributions on W-coated divertor tiles used in the third JET ITER-like wall campaign. *Nuclear Materials and Energy*, 18, 258–261. doi:10.1016/j.nme.2019.01.001
- Ikedo, T., Brito, R., & Cardoso, V. (2019). Blasts of Light from Axions. *Physical Review Letters*, 122(8). doi:10.1103/physrevlett.122.081101
- Ivanov, I. P., Nishi, C. C., Silva, J. P., & Trautner, A. (2019). Basis-invariant conditions for CP symmetry of order four. *Physical Review D*, 99(1). doi:10.1103/physrevd.99.015039
- Joffrin, E. et al. (2019). Overview of the JET preparation for deuterium-tritium operation with the ITER like-wall. *Nuclear Fusion*, 59(11), 112021. doi:10.1088/1741-4326/ab2276
- Jorge, R., Ricci, P., Brunner, S., Gamba, S., Konovets, V., Loureiro, N. F., Perrone, L. M., & Teixeira, N. (2019). Linear theory of electron-plasma waves at arbitrary collisionality. *Journal of Plasma Physics*, 85(2). doi:10.1017/s0022377819000266
- Kampert, K.-H., Alejandro Mostafa, M., & Zas, E. (2019). Multi-messenger physics with the Pierre Auger Observatory. *Frontiers in Astronomy and Space Sciences*, 6. doi:10.3389/fspas.2019.00024
- Kaufmann, H. T. C., Silva, C., & Benilov, M. S. (2019). Numerical simulation of the initial stage of unipolar arcing in fusion-relevant conditions. *Plasma Physics and Controlled Fusion*, 61(9), 095001. doi:10.1088/1361-6587/ab2fac
- Khokle, R. P., Franco, F., de Freitas, S. C., Esselle, K. P., Heimlich, M. C., & Bokor, D. J. (2019). Eddy Current-tunneling magneto-resistive sensor for micromotion detection of a tibial orthopaedic implant. *IEEE Sensors Journal*, 19(4), 1285–1292. doi:10.1109/jsen.2018.2881957
- Kikoła, D., Brodsky, S. J., Cavoto, G. et al. (2019). A fixed-target programme at the LHC for heavy-ion, hadron, spin and astroparticle physics: AF-TER@LHC. *Nuclear Physics A*, 982, 971–974. doi:10.1016/j.nuclphysa.2018.09.063
- Klinger, T. et al. (2019). Overview of first Wendelstein 7-X high-performance operation. *Nuclear*

- Fusion*, 59(11), 112004. doi:10.1088/1741-4326/ab03a7
- Kudlacek, O., Marchiori, G., Finotto, C., Bettini, P., Henriques, R., Carvalho, B. B., Figueiredo, H., & Fernandes, H. (2019). Cleaning of the Eddy Current Effects From Magnetic Diagnostics. *IEEE Transactions on Plasma Science*, 47(1), 858–863. doi:10.1109/tps.2018.2869413
- Larsen, A. W., Korsholm, S. B., Gonçalves, B. et al. (2019). Mitigation of EC breakdown in the gyrotron transmission line of the ITER collective Thomson scattering diagnostic via a split biased waveguide. *Journal of Instrumentation*, 14(11), C11009–C11009. doi:10.1088/1748-0221/14/11/c11009
- Lawson, K. D., Aggarwal, K. M., Coffey, I. H., Keenan, F. P., & O'Mullane, M. G. (2019). Population modelling of the He II energy levels in tokamak plasmas: I. Collisional excitation model. *Journal of Physics B: Atomic, Molecular and Optical Physics*, 52(4), 045001. doi:10.1088/1361-6455/aaf703
- Lehmann, M., Maisch, S., Scheuring, N., Carvalho, J., Cruz, C., Sebastião, P. J., & Dong, R. Y. (2019). From molecular biaxiality of real board-shaped mesogens to phase biaxiality? On the hunt for the holy grail of liquid crystal science. *Soft Matter*, 15(42), 8496–8511. doi:10.1039/c9sm01007f
- Lopes, I. (2018). The sterile-active neutrino flavor model: the imprint of dark matter on the electron neutrino spectra. *The Astrophysical Journal*, 869(2), 112. doi:10.3847/1538-4357/aab2f
- Lopes, J., Lopes, I., & Silk, J. (2019). Astero-seismology of red clump stars as a probe of the dark matter content of the galaxy central region. *The Astrophysical Journal*, 880(2), L25. doi:10.3847/2041-8213/ab2fdd
- Lopes, J., & Lopes, I. (2019). Asymmetric dark matter imprint on low-mass main-sequence stars in the Milky Way nuclear star cluster. *The Astrophysical Journal*, 879(1), 50. doi:10.3847/1538-4357/ab2392
- Lopes, L., Alves, A. B., Assis, P. et al. (2019). Long term experience in Autonomous Stations and production quality control. *Journal of Instrumentation*, 14(07), C07002–C07002. doi:10.1088/1748-0221/14/07/c07002
- Loureiro, J. P. S., Iafrati, M., Fernandes, H., Mazzitelli, G., Silva, C., Gomes, R., Pereira, T., Figueiredo, H., & Alves, H. (2019). Liquid tin interactions with ISTTOK plasmas. *Fusion Engineering and Design*, 148, 111268. doi:10.1016/j.fusengdes.2019.111268
- Martins, J. L., Vieira, J., Ferri, J., & Fülöp, T. (2019). Radiation emission in laser-wakefields driven by structured laser pulses with orbital angular momentum. *Scientific Reports*, 9(1). doi:10.1038/s41598-019-45474-8
- Luna, R., Zilhão, M., Cardoso, V., Costa, J. L., & Natário, J. (2019). Strong cosmic censorship: The nonlinear story. *Physical Review D*, 99(6). doi:10.1103/physrevd.99.064014
- Lv, H., Fidalgo, J., Leitão, D. C., Silva, A. V., Kämpfe, T., Riedel, S., Langer, J., Wrona, J., Ocker, B., Freitas, P. P., & Cardoso, S. (2019). The annealing effect on memory state stability and interlayer coupling in perpendicular magnetic tunnel junctions with ultrathin MgO barrier. *Journal of Magnetism and Magnetic Materials*, 477, 142–146. doi:10.1016/j.jmmm.2019.01.050
- Lv, H., Fidalgo, J., Silva, A. V. et al. (2019). Assessment of conduction mechanisms through MgO ultrathin barriers in CoFeB/MgO/CoFeB perpendicular magnetic tunnel junctions. *Applied Physics Letters*, 114(10), 102402. doi:10.1063/1.5087952
- Lv, H., Leitao, D. C., Pruegl, K., Raberg, W., Freitas, P. P., & Cardoso, S. (2019). Impact of blocking temperature distribution on the thermal behavior of MnIr and MnPt magnetoresistive stacks. *Journal of Magnetism and Magnetic Materials*, 477, 68–73. doi:10.1016/j.jmmm.2019.01.007
- Maggio, E., Cardoso, V., Dolan, S. R., & Pani, P. (2019). Ergoregion instability of exotic compact objects: Electromagnetic and gravitational perturbations and the role of absorption. *Physical Review D*, 99(6). doi:10.1103/physrevd.99.064007
- Marti, D., Marzan, I., Sachsenhausen, J., Alvarez-Marrón, J., Ruiz, M., Torne, M., Mendes, M., & Carbonell, R. (2019). 3-D seismic travel-time tomography validation of a detailed subsurface model: a case study of the Zánacara river basin (Cuenca, Spain). *Solid Earth*, 10(1), 177–192. doi:10.5194/se-10-177-2019
- Mateus, J. C., Lopes, C. D. F., Cerquido, M., Leitão, L., Leitão, D., Cardoso, S., Ventura, J., & Aguiar, P. (2019). Improved in vitro electrophysiology using 3D-structured microelectrode arrays with a micro-mushrooms islets architecture capable of promoting topotaxis. *Journal of Neural Engineering*, 16(3), 036012. doi:10.1088/1741-2552/ab0b86
- Mecca, A., Cravo, E., Deluva, A., Crespo, R., Cowley, A. A., Arriaga, A., Wiringa, R. B., & Noro, T. (2019). Interplay of dynamical and structure effects in the observables for 12C(p,2p) near 400 MeV with polarized and unpolarized beams. *Physics Letters B*, 798, 134989. doi:10.1016/j.physletb.2019.134989
- Mera, B., Sacha, K., & Omar, Y. (2019). Topologically protected quantization of work. *Physical Review Letters*, 123(2). doi:10.1103/physrevlett.123.020601
- Mouquinho, A., Figueirinhas, J., & Sotomayor, J. (2019). Digital optical memory devices based on polymer-dispersed liquid crystals films: appropriate polymer matrix morphology. *Liquid Crystals*, 47(5), 636–649. doi:10.1080/02678292.2019.1667444
- M., Centioli, C., Marocco, D., Esposito, B., Correia, C. M. B., & Pereira, R. C. (2019). The Design and Performance of the real-time software architecture for the ITER radial neutron camera. *IEEE Transactions on Nuclear Science*, 66(7), 1310–1317. doi:10.1109/tns.2019.2907056
- Nabais, F., Bizarro, J. P. S., Borba, D. et al. (2019). Energetic ion losses ‘channeling’ mechanism and strategy for mitigation. *Plasma Physics and Controlled Fusion*, 61(8), 084008. doi:10.1088/1361-6587/ab27fd
- Oh, G. for CMS Collaboration(2019). Beyond nPDFs effects: Prompt J/ψ and ψ(2S) production in pPb and pp collisions. *Nuclear Physics A*, 982, 743–746. doi:10.1016/j.nuclphysa.2018.10.028
- Oliveira, M. M., Ribeiro, P., & Kirchner, S. (2019). Classical and quantum liquids induced by quantum fluctuations. *Physical Review Letters*, 122(19). doi:10.1103/physrevlett.122.197601
- Olyaei, H. Z., Ribeiro, P., & Castro, E. V. (2019). Transmission across a bilayer graphene region. *Physical Review B*, 99(20). doi:10.1103/physrevb.99.205436
- Pimenta, S., Cardoso, S., Castanheira, E. M. S., & Minas, G. (2019). Towards an on-chip optical microsystem for spectroscopic detection of gastrointestinal dysplasia. *Sensors and Actuators B: Chemical*, 281, 751–756. doi:10.1016/j.snb.2018.10.142
- Pinto, M., Goncalves, P., Marques, A., Pinto, J. C., & Hajdas, W. (2019). Development of a Directionality Detector for RADEM, the Radiation Hard Electron Monitor Aboard the JUICE Mission. *IEEE Transactions on Nuclear Science*, 66(7), 1770–1777. doi:10.1109/tns.2019.2900398
- Pinto, M., & Gonçalves, P. (2019). GUIMesh: A tool to import STEP geometries into Geant4 via GDML. *Computer Physics Communications*, 239, 150–156. doi:10.1016/j.cpc.2019.01.024
- Puel, T. O., Chesi, S., Kirchner, S., & Ribeiro, P. (2019). Mixed-order symmetry-breaking quantum phase transition far from equilibrium. *Physical Review Letters*, 122(23). doi:10.1103/physrevlett.122.235701
- Ramstein, B. et al. (2019). Time-like baryon transitions studies with HADES. *EPJ Web of Conferences*, 199, 01008. doi:10.1051/epjconf/201919901008
- Raposo, G., Pani, P., Bezares, M., Palenzuela, C., & Cardoso, V. (2019). Anisotropic stars as ultra-compact objects in general relativity. *Physical Review D*, 99(10). doi:10.1103/physrevd.99.104072
- Rebelo, M. N. (2019, June). Neutrino physics and leptonic weak basis invariants. Particle Physics at the Silver Jubilee of Lomonosov Conferences. *Eighteenth Lomonosov Conference on Elementary Particle Physics*. doi:10.1142/9789811202339_0024
- Reis, C. L., & Martins, J. L. (2019). Practical band interpolation with a modified tight-binding method. *Journal of Physics: Condensed Matter*, 31(21), 215501. doi:10.1088/1361-648x/ab0932
- Ribeiro, A., João, C., Künzel, S., Koliyadu, J., André, P., & Fajardo, M. (2019). Development of a compact and portable SHG FROG. In M. F. P. Martins Costa (Ed.), *Fourth International Con-*

- ference on Applications of Optics and Photonics. SPIE. doi:10.1117/12.2530804
- Ribeiro, P., & Prosen, T. (2019). Integrable quantum dynamics of open collective spin models. *Physical Review Letters*, 122(1). doi:10.1103/physrevlett.122.010401
- Riva, M., Pollastrone, F., Centioli, C., Marocco, D., Esposito, B., Correia, C. M. B., Cardoso, J. M. R., & Pereira, R. C. (2019). Linux device driver for radial neutron camera in view of ITER long pulses with variable data throughput. *Fusion Engineering and Design*, 146, 1698–1702. doi:10.1016/j.fusengdes.2019.03.019
- Roque, A., Sousa, D. M., Sebastião, P., Margato, E., & Marques, G. (2019). FFC NMR relaxometer with magnetic flux density control. *Journal of Low Power Electronics and Applications*, 9(3), 22. doi:10.3390/jlpea9030022
- Roytershteyn, V., Boldyrev, S., Delzanno, G. L., Chen, C. H. K., Grošelj, D., & Loureiro, N. F. (2019). Numerical study of inertial Kinetic-Alfvén turbulence. *The Astrophysical Journal*, 870(2), 103. doi:10.3847/1538-4357/aaf288
- Sagun, V. V., Lopes, I., & Ivanytskyi, A. I. (2019). The induced surface tension contribution for the equation of state of neutron stars. *The Astrophysical Journal*, 871(2), 157. doi:10.3847/1538-4357/aaf805
- Santos Fernandes, L., Lopez, B., & Lino da Silva, M. (2019). Computational fluid radiative dynamics of the Galileo Jupiter entry. *Physics of Fluids*, 31(10), 106104. doi:10.1063/1.5115264
- Santos, B., Cruz, N., Fernandes, A. et al. (2019). Real-Time data compression for data acquisition systems applied to the ITER radial neutron camera. *IEEE Transactions on Nuclear Science*, 66(7), 1324–1329. doi:10.1109/tns.2019.2899319
- Sebastião, P. J. (n.d.). NMR relaxometry in liquid crystals: Molecular organization and molecular dynamics interrelation. *New Developments in NMR* (pp. 255–302). Royal Society of Chemistry. doi:10.1039/9781788012966-00255
- Seliunin, E., Silva, C., Manz, P. et al. (2019). Validation of the edge density profiles from the ICRF antenna reflectometer on ASDEX Upgrade. *Journal of Instrumentation*, 14(10), C10014. doi:10.1088/1748-0221/14/10/c10014
- Shakirov, A. M., Rubtsov, A. N., & Ribeiro, P. (2019). Spin transfer torque induced paramagnetic resonance. *Physical Review B*, 99(5). doi:10.1103/physrevb.99.054434
- Shaukat, M. I., Castro, E. V., & Terças, H. (2019). Spontaneous generation of phononic entanglement in quantum dark-soliton qubits. *Physical Review A*, 99(4). doi:10.1103/physreva.99.042326
- Shi, Z. et al. (2019). D0-Meson R in PbPb collisions at $\sqrt{s_{NN}}=5.02$ TeV and elliptic flow in pPb collisions at $\sqrt{s_{NN}}=8.16$ TeV with CMS. *Nuclear Physics A*, 982, 647–650. doi:10.1016/j.nuclphysa.2018.08.029
- Sias, G., Cannas, B., Fanni, A., Murari, A., & Pau, A. (2019). A locked mode indicator for disruption prediction on JET and ASDEX upgrade. *Fusion Engineering and Design*, 138, 254–266. doi:10.1016/j.fusengdes.2018.11.021
- Silva, M., Silva, J. F., Leitao, D. C., Cardoso, S., & Freitas, P. P. (2019). Optimization of the gap size of flux concentrators: pushing further on low noise levels and high sensitivities in spin-valve sensors. *IEEE Transactions on Magnetics*, 55(7), 1–5. doi:10.1109/tmag.2019.2899808
- Silverio, V., Amaral, M., Gaspar, J., Cardoso, S., & Freitas, P. P. (2019). Manipulation of magnetic beads with thin film microelectromagnet traps. *Micromachines*, 10(9), 607. doi:10.3390/mi10090607
- Silverio, V., Silva, A. V., Przykaza, K., Santos, L. F., Melo, L. V., & Cardoso, S. (2019). Dark matters: black-PDMS nanocomposite for opaque microfluidic systems. *Physical Chemistry Chemical Physics*, 21(5), 2719–2726. doi:10.1039/c8cp06828c
- Sirunyan, A. M. et al (2019). Measurement of differential cross sections for Z boson pair production in association with jets at $\sqrt{s}=8$ and 13 TeV. *Physics Letters B*, 789, 19–44. doi:10.1016/j.physletb.2018.11.007
- Sirunyan, A. M. et al (2019). Measurement of nuclear modification factors of $\Upsilon(1S)$, $\Upsilon(2S)$, and $\Upsilon(3S)$ mesons in PbPb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *Physics Letters B*, 790, 270–293. doi:10.1016/j.physletb.2019.01.006
- Sirunyan, A. M. et al (2019). Measurement of prompt $\psi(2S)$ production cross sections in proton–lead and proton–proton collisions at $\sqrt{s_{NN}}=5.02$ TeV. *Physics Letters B*, 790, 509–532. doi:10.1016/j.physletb.2019.01.058
- Sirunyan, A. M. et al (2019). Measurements of properties of the Higgs boson decaying to a W boson pair in pp collisions at $\sqrt{s}=13$ TeV. *Physics Letters B*, 791, 96–129. doi:10.1016/j.physletb.2018.12.073
- Sirunyan, A. M. et al (2019). Non-Gaussian elliptic-flow fluctuations in PbPb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *Physics Letters B*, 789, 643–665. doi:10.1016/j.physletb.2018.11.063
- Sirunyan, A. M. et al (2019). Search for a W boson decaying to a τ lepton and a neutrino in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physics Letters B*, 792, 107–131. doi:10.1016/j.physletb.2019.01.069
- Sirunyan, A. M. et al (2019). Search for Higgs boson pair production in the $\gamma\gamma b\bar{b}$ final state in pp collisions at $\sqrt{s}=13$ TeV. *Physics Letters B*, 788, 7–36. doi:10.1016/j.physletb.2018.10.056
- Sirunyan, A. M. et al (2019). Search for supersymmetric partners of electrons and muons in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physics Letters B*, 790, 140–166. doi:10.1016/j.physletb.2019.01.005
- Sirunyan, A. M. et al. (2019). A search for pair production of new light bosons decaying into muons in proton–proton collisions at 13 TeV. *Physics Letters B*, 796, 131–154. doi:10.1016/j.physletb.2019.07.013
- Sirunyan, A. M. et al. (2019). An embedding technique to determine $\tau\tau$ backgrounds in proton–proton collision data. *Journal of Instrumentation*, 14(06), P06032–P06032. doi:10.1088/1748-0221/14/06/p06032
- Sirunyan, A. M. et al. (2019). Azimuthal separation in nearly back-to-back jet topologies in inclusive 2- and 3-jet events in $\sqrt{s}=13$ TeV collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(9). doi:10.1140/epjc/s10052-019-7276-4
- Sirunyan, A. M. et al. (2019). Centrality and pseudorapidity dependence of the transverse energy density in pPb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *Physical Review C*, 100(2). doi:10.1103/physrevc.100.024902
- Sirunyan, A. M. et al. (2019). Charged-particle angular correlations in XeXe collisions at $\sqrt{s_{NN}}=5.44$ TeV. *Physical Review C*, 100(4). doi:10.1103/physrevc.100.044902
- Sirunyan, A. M. et al. (2019). Combination of CMS searches for heavy resonances decaying to pairs of bosons or leptons. *Physics Letters B*, 798, 134952. doi:10.1016/j.physletb.2019.134952
- Sirunyan, A. M. et al. (2019). Combination of searches for Higgs boson pair production in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 122(12). doi:10.1103/physrevlett.122.121803
- Sirunyan, A. M. et al. (2019). Combined measurements of Higgs boson couplings in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(5). doi:10.1140/epjc/s10052-019-6909-y
- Sirunyan, A. M. et al. (2019). Constraints on anomalous HVV couplings from the production of Higgs bosons decaying to τ lepton pairs. *Physical Review D*, 100(11). doi:10.1103/physrevd.100.112002
- Sirunyan, A. M. et al. (2019). Erratum to: Search for a new scalar resonance decaying to a pair of Z bosons in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)128
- Sirunyan, A. M. et al. (2019). Evidence for light-by-light scattering and searches for axion-like particles in ultraperipheral PbPb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *Physics Letters B*, 797, 134826. doi:10.1016/j.physletb.2019.134826
- Sirunyan, A. M. et al. (2019). Inclusive search for supersymmetry in pp collisions at $\sqrt{s}=13$ TeV using razor variables and boosted object identification in zero and one lepton final states. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)031
- Sirunyan, A. M. et al. (2019). Jet shapes of isolated photon-tagged jets in Pb-Pb and pp collisions

- at $\sqrt{s}=5.02$ TeV. *Physical Review Letters*, 122(15). doi:10.1103/physrevlett.122.152001
- Sirunyan, A. M. et al. (2019). Measurement and interpretation of differential cross sections for Higgs boson production at $\sqrt{s}=13$ TeV. *Physics Letters B*, 792, 369–396. doi:10.1016/j.physletb.2019.03.059
- Sirunyan, A. M. et al. (2019). Measurement of associated production of a W boson and a charm quark in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(3). doi:10.1140/epjc/s10052-019-6752-1
- Sirunyan, A. M. et al. (2019). Measurement of B_s^0 meson production in pp and PbPb collisions at $\sqrt{s}=5.02$ TeV. *Physics Letters B*, 796, 168–190. doi:10.1016/j.physletb.2019.07.014
- Sirunyan, A. M. et al. (2019). Measurement of differential cross sections for inclusive isolated-photon and photon+jet production in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(1). doi:10.1140/epjc/s10052-018-6482-9
- Sirunyan, A. M. et al. (2019). Measurement of electroweak WZ boson production and search for new physics in WZ + two jets events in pp collisions at $\sqrt{s}=13$ TeV. *Physics Letters B*, 795, 281–307. doi:10.1016/j.physletb.2019.05.042
- Sirunyan, A. M. et al. (2019). Measurement of exclusive Υ photoproduction from protons in pp collisions at $\sqrt{s}=5.02$ TeV. *The European Physical Journal C*, 79(3). doi:10.1140/epjc/s10052-019-6774-8
- Sirunyan, A. M. et al. (2019). Measurement of exclusive $\rho(770)^0$ photoproduction in ultraperipheral pPb collisions at $\sqrt{s}=5.02$ TeV. *The European Physical Journal C*, 79(8). doi:10.1140/epjc/s10052-019-7202-9
- Sirunyan, A. M. et al. (2019). Measurement of inclusive and differential Higgs boson production cross sections in the diphoton decay channel in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)183
- Sirunyan, A. M. et al. (2019). Measurement of inclusive very forward jet cross sections in proton–lead collisions at $\sqrt{s}=5.02$ TeV. *Journal of High Energy Physics*, 2019(5). doi:10.1007/jhep05(2019)043
- Sirunyan, A. M. et al. (2019). Measurement of the average very forward energy as a function of the track multiplicity at central pseudorapidities in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(11). doi:10.1140/epjc/s10052-019-7402-3
- Sirunyan, A. M. et al. (2019). Measurement of the differential Drell-Yan cross section in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(12). doi:10.1007/jhep12(2019)059
- Sirunyan, A. M. et al. (2019). Measurement of the energy density as a function of pseudorapidity in proton–proton collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(5). doi:10.1140/epjc/s10052-019-6861-x
- Sirunyan, A. M. et al. (2019). Measurement of the top quark mass in the all-jets final state at $\sqrt{s}=13$ TeV and combination with the lepton+jets channel. *The European Physical Journal C*, 79(4). doi:10.1140/epjc/s10052-019-6788-2
- Sirunyan, A. M. et al. (2019). Measurement of the top quark polarization and $t\bar{t}$ spin correlations using dilepton final states in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review D*, 100(7). doi:10.1103/physrevd.100.072002
- Sirunyan, A. M. et al. (2019). Measurement of the top quark Yukawa coupling from $t\bar{t}$ kinematic distributions in the lepton+jets final state in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review D*, 100(7). doi:10.1103/physrevd.100.072007
- Sirunyan, A. M. et al. (2019). Measurement of the $t\bar{t}$ production cross section, the top quark mass, and the strong coupling constant using dilepton events in pp collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(5). doi:10.1140/epjc/s10052-019-6863-8
- Sirunyan, A. M. et al. (2019). Measurements of differential Z boson production cross sections in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(12). doi:10.1007/jhep12(2019)061
- Sirunyan, A. M. et al. (2019). Measurements of the Higgs boson width and anomalous HVV couplings from on-shell and off-shell production in the four-lepton final state. *Physical Review D*, 99(11). doi:10.1103/physrevd.99.112003
- Sirunyan, A. M. et al. (2019). Measurements of the $pp \rightarrow WZ$ inclusive and differential production cross sections and constraints on charged anomalous triple gauge couplings at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(4). doi:10.1007/jhep04(2019)122
- Sirunyan, A. M. et al. (2019). Measurements of triple-differential cross sections for inclusive isolated-photon+jet events in pp collisions at $\sqrt{s}=8$ TeV. *The European Physical Journal C*, 79(11). doi:10.1140/epjc/s10052-019-7451-7
- Sirunyan, A. M. et al. (2019). Measurements of \overline{t} differential cross sections in proton–proton collisions at $\sqrt{s}=13$ TeV using events containing two leptons. *Journal of High Energy Physics*, 2019(2). doi:10.1007/jhep02(2019)149
- Sirunyan, A. M. et al. (2019). Nuclear dependence of light neutral meson production in p-A collisions at 400 GeV with NA60. *The European Physical Journal C*, 79(5). doi:10.1140/epjc/s10052-019-6848-7
- Sirunyan, A. M. et al. (2019). Observation of prompt J/ψ meson elliptic flow in high-multiplicity pPb collisions at $\sqrt{s}=8.16$ TeV. *Physics Letters B*, 791, 172–194. doi:10.1016/j.physletb.2019.02.018
- Sirunyan, A. M. et al. (2019). Observation of single top quark production in association with a Z boson in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 122(13). doi:10.1103/physrevlett.122.132003
- Sirunyan, A. M. et al. (2019). Observation of two excited B_c^+ states and measurement of the $B_c^+(2S)$ mass in pp collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 122(13). doi:10.1103/physrevlett.122.132001
- Sirunyan, A. M. et al. (2019). Performance of missing transverse momentum reconstruction in proton–proton collisions at $\sqrt{s}=13$ TeV using the CMS detector. *Journal of Instrumentation*, 14(07), P07004. doi:10.1088/1748-0221/14/07/p07004
- Sirunyan, A. M. et al. (2019). Probing the chiral magnetic wave in pPb and PbPb collisions at $\sqrt{s}=5.02$ TeV using charge-dependent azimuthal anisotropies. *Physical Review C*, 100(6). doi:10.1103/physrevc.100.064908
- Sirunyan, A. M. et al. (2019). Pseudorapidity distributions of charged hadrons in xenon–xenon collisions at $\sqrt{s}=5.44$ TeV. *Physics Letters B*, 799, 135049. doi:10.1016/j.physletb.2019.135049
- Sirunyan, A. M. et al. (2019). Search for a heavy pseudoscalar boson decaying to a Z and a Higgs boson at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(7). doi:10.1140/epjc/s10052-019-7058-z
- Sirunyan, A. M. et al. (2019). Search for a heavy resonance decaying to a top quark and a vector-like top quark in the lepton + jets final state in pp collisions at $\sqrt{s}=13$ TeV. *The European Physical Journal C*, 79(3). doi:10.1140/epjc/s10052-019-6688-5
- Sirunyan, A. M. et al. (2019). Search for a light charged Higgs boson decaying to a w boson and a cp-odd higgs boson in final states with $e\mu$ or $\mu\mu$ in proton–proton collisions at $\sqrt{s}=13$ TeV. *Physical Review Letters*, 123(13). doi:10.1103/physrevlett.123.131802
- Sirunyan, A. M. et al. (2019). Search for a low-mass $\tau\text{--}\tau^+$ resonance in association with a bottom quark in proton–proton collisions at $\sqrt{s}=13$ TeV. *Journal of High Energy Physics*, 2019(5). doi:10.1007/jhep05(2019)210
- Sirunyan, A. M. et al. (2019). Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV in the diphoton final state in proton–proton collisions at $\sqrt{s}=8$ and 13 TeV. *Physics Letters B*, 793, 320–347. doi:10.1016/j.physletb.2019.03.064

- Sirunyan, A. M. et al. (2019). Search for a W' boson decaying to a vector-like quark and a top or bottom quark in the all-jets final state. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)127
- Sirunyan, A. M. et al. (2019). Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state with two muons and two b quarks in pp collisions at 13 TeV. *Physics Letters B*, 795, 398–423. doi:10.1016/j.physletb.2019.06.021
- Sirunyan, A. M. et al. (2019). Search for anomalous electroweak production of vector boson pairs in association with two jets in proton–proton collisions at 13 TeV. *Physics Letters B*, 798, 134985. doi:10.1016/j.physletb.2019.134985
- Sirunyan, A. M. et al. (2019). Search for anomalous triple gauge couplings in WW and WZ production in lepton + jet events in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(12). doi:10.1007/jhep12(2019)062
- Sirunyan, A. M. et al. (2019). Search for associated production of a Higgs boson and a single top quark in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 99(9). doi:10.1103/physrevd.99.092005
- Sirunyan, A. M. et al. (2019). Search for charged Higgs bosons in the $H^\pm \rightarrow \tau^\pm \nu_\tau$ decay channel in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(7). doi:10.1007/jhep07(2019)142
- Sirunyan, A. M. et al. (2019). Search for contact interactions and large extra dimensions in the dilepton mass spectra from proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(4). doi:10.1007/jhep04(2019)114
- Sirunyan, A. M. et al. (2019). Search for dark matter in events with a leptoquark and missing transverse momentum in proton–proton collisions at 13 TeV. *Physics Letters B*, 795, 76–99. doi:10.1016/j.physletb.2019.05.046
- Sirunyan, A. M. et al. (2019). Search for dark matter particles produced in association with a top quark pair at $s = 13$ TeV. *Physical Review Letters*, 122(1). doi:10.1103/physrevlett.122.011803
- Sirunyan, A. M. et al. (2019). Search for dark matter produced in association with a Higgs boson decaying to a pair of bottom quarks in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(3). doi:10.1140/epjc/s10052-019-6730-7
- Sirunyan, A. M. et al. (2019). Search for dark matter produced in association with a single top quark or a top quark pair in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)141
- Sirunyan, A. M. et al. (2019). Search for dark photons in decays of Higgs bosons produced in association with Z bosons in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(10). doi:10.1007/jhep10(2019)139
- Sirunyan, A. M. et al. (2019). Search for heavy Majorana neutrinos in same-sign dilepton channels in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)122
- Sirunyan, A. M. et al. (2019). Search for heavy neutrinos and third-generation leptoquarks in hadronic states of two τ leptons and two jets in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)170
- Sirunyan, A. M. et al. (2019). Search for heavy resonances decaying into two Higgs bosons or into a Higgs boson and a W or Z boson in proton–proton collisions at 13 TeV. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)051
- Sirunyan, A. M. et al. (2019). Search for Higgs and Z boson decays to J/ψ or Y pairs in the four-muon final state in proton–proton collisions at $s = 13$ TeV. *Physics Letters B*, 797, 134811. doi:10.1016/j.physletb.2019.134811
- Sirunyan, A. M. et al. (2019). Search for invisible decays of a Higgs boson produced through vector boson fusion in proton–proton collisions at $s = 13$ TeV. *Physics Letters B*, 793, 520–551. doi:10.1016/j.physletb.2019.04.025
- Sirunyan, A. M. et al. (2019). Search for long-lived particles decaying into displaced jets in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 99(3). doi:10.1103/physrevd.99.032011
- Sirunyan, A. M. et al. (2019). Search for long-lived particles using delayed photons in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 100(11). doi:10.1103/physrevd.100.112003
- Sirunyan, A. M. et al. (2019). Search for long-lived particles using nonprompt jets and missing transverse momentum with proton–proton collisions at $s = 13$ TeV. *Physics Letters B*, 797, 134876. doi:10.1016/j.physletb.2019.134876
- Sirunyan, A. M. et al. (2019). Search for low mass vector resonances decaying into quark–antiquark pairs in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 100(11). doi:10.1103/physrevd.100.112007
- Sirunyan, A. M. et al. (2019). Search for low-mass quark–antiquark resonances produced in association with a photon at $s = 13$ TeV. *Physical Review Letters*, 123(23). doi:10.1103/physrevlett.123.231803
- Sirunyan, A. M. et al. (2019). Search for low-mass resonances decaying into bottom quark–antiquark pairs in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 99(1). doi:10.1103/physrevd.99.012005
- Sirunyan, A. M. et al. (2019). Search for MSSM Higgs bosons decaying to $\mu^+\mu^-$ in proton–proton collisions at $s = 13$ TeV. *Physics Letters B*, 798, 134992. doi:10.1016/j.physletb.2019.134992
- Sirunyan, A. M. et al. (2019). Search for narrow H_γ resonances in proton–proton collisions at $s = 13$ TeV. *Physical Review Letters*, 122(8). doi:10.1103/physrevlett.122.081804
- Sirunyan, A. M. et al. (2019). Search for new particles decaying to a jet and an emerging jet. *Journal of High Energy Physics*, 2019(2). doi:10.1007/jhep02(2019)179
- Sirunyan, A. M. et al. (2019). Search for new physics in final states with a single photon and missing transverse momentum in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(2). doi:10.1007/jhep02(2019)074
- Sirunyan, A. M. et al. (2019). Search for new physics in top quark production in dilepton final states in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(11). doi:10.1140/epjc/s10052-019-7387-y
- Sirunyan, A. M. et al. (2019). Search for non-resonant Higgs boson pair production in the $b(\bar{b})\overline{b}(\bar{b})$ final state at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(4). doi:10.1007/jhep04(2019)112
- Sirunyan, A. M. et al. (2019). Search for pair production of first-generation scalar leptoquarks at $s = 13$ TeV. *Physical Review D*, 99(5). doi:10.1103/physrevd.99.052002
- Sirunyan, A. M. et al. (2019). Search for pair production of second-generation leptoquarks at $s = 13$ TeV. *Physical Review D*, 99(3). doi:10.1103/physrevd.99.032014
- Sirunyan, A. M. et al. (2019). Search for pair production of vectorlike quarks in the fully hadronic final state. *Physical Review D*, 100(7). doi:10.1103/physrevd.100.072001
- Sirunyan, A. M. et al. (2019). Search for pair-produced three-jet resonances in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 99(1). doi:10.1103/physrevd.99.012010
- Sirunyan, A. M. et al. (2019). Search for physics beyond the standard model in events with overlapping photons and jets. *Physical Review Letters*, 123(24). doi:10.1103/physrevlett.123.241801
- Sirunyan, A. M. et al. (2019). Search for production of Higgs boson pairs in the four b quark final state using large-area jets in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)040
- Sirunyan, A. M. et al. (2019). Search for rare decays of Z and Higgs bosons to J/ψ and a photon in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(2). doi:10.1140/epjc/s10052-019-6562-5
- Sirunyan, A. M. et al. (2019). Search for resonances decaying to a pair of Higgs bosons in the

- $\overline{b} \overline{q} \overline{b}$ final state in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(10). doi:10.1007/jhep10(2019)125
- Sirunyan, A. M. et al. (2019). Search for resonant production of second-generation sleptons with same-sign dimuon events in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(4). doi:10.1140/epjc/s10052-019-6800-x
- Sirunyan, A. M. et al. (2019). Search for resonant $t \overline{t}$ production in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(4). doi:10.1007/jhep04(2019)031
- Sirunyan, A. M. et al. (2019). Search for single production of vector-like quarks decaying to a top quark and a W boson in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(2). doi:10.1140/epjc/s10052-019-6556-3
- Sirunyan, A. M. et al. (2019). Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(1). doi:10.1007/jhep01(2019)154
- Sirunyan, A. M. et al. (2019). Search for supersymmetry in events with a photon, jets, b -jets, and missing transverse momentum in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(5). doi:10.1140/epjc/s10052-019-6926-x
- Sirunyan, A. M. et al. (2019). Search for supersymmetry in final states with photons and missing transverse momentum in proton–proton collisions at 13 TeV. *Journal of High Energy Physics*, 2019(6). doi:10.1007/jhep06(2019)143
- Sirunyan, A. M. et al. (2019). Search for supersymmetry in proton–proton collisions at 13 TeV in final states with jets and missing transverse momentum. *Journal of High Energy Physics*, 2019(10). doi:10.1007/jhep10(2019)244
- Sirunyan, A. M. et al. (2019). Search for supersymmetry using Higgs boson to diphoton decays at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(11). doi:10.1007/jhep11(2019)109
- Sirunyan, A. M. et al. (2019). Search for supersymmetry with a compressed mass spectrum in the vector boson fusion topology with 1-lepton and 0-lepton final states in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(8). doi:10.1007/jhep08(2019)150
- Sirunyan, A. M. et al. (2019). Search for the associated production of the Higgs boson and a vector boson in proton–proton collisions at $\sqrt{s} = 13$ TeV via Higgs boson decays to τ leptons. *Journal of High Energy Physics*, 2019(6). doi:10.1007/jhep06(2019)093
- Sirunyan, A. M. et al. (2019). Search for the Higgs boson decaying to two muons in proton–proton collisions at $s = 13$ TeV. *Physical Review Letters*, 122(2). doi:10.1103/physrevlett.122.021801
- Sirunyan, A. M. et al. (2019). Search for the pair production of light top squarks in the $e \pm \mu \mp$ final state in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)101
- Sirunyan, A. M. et al. (2019). Search for the production of four top quarks in the single-lepton and opposite-sign dilepton final states in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(11). doi:10.1007/jhep11(2019)082
- Sirunyan, A. M. et al. (2019). Search for the production of $W \pm W \pm W \mp$ events at $s = 13$ TeV. *Physical Review D*, 100(1). doi:10.1103/physrevd.100.012004
- Sirunyan, A. M. et al. (2019). Search for top quark partners with charge $5/3$ in the same-sign dilepton and single-lepton final states in proton–proton collisions at $s = 13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)082
- Sirunyan, A. M. et al. (2019). Search for vector-like leptons in multilepton final states in proton–proton collisions at $s = 13$ TeV. *Physical Review D*, 100(5). doi:10.1103/physrevd.100.052003
- Sirunyan, A. M. et al. (2019). Search for vector-like quarks in events with two oppositely charged leptons and jets in proton–proton collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(4). doi:10.1140/epjc/s10052-019-6855-8
- Sirunyan, A. M. et al. (2019). Search for W boson decays to three charged pions. *Physical Review Letters*, 122(15). doi:10.1103/physrevlett.122.151802
- Sirunyan, A. M. et al. (2019). Search for $\overline{t} \overline{H} \rightarrow \overline{b} \overline{b}$ decay channel with leptonic $\overline{t} \overline{t}$ decays in proton–proton collisions at $\sqrt{s} = 13$ TeV. *Journal of High Energy Physics*, 2019(3). doi:10.1007/jhep03(2019)026
- Sirunyan, A. M. et al. (2019). Studies of beauty suppression via nonprompt D_0 mesons in Pb–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. *Physical Review Letters*, 123(2). doi:10.1103/physrevlett.123.022001
- Sirunyan, A. M. et al. (2019). Study of the underlying event in top quark pair production in $p p$ collisions at $\sqrt{s} = 13$ TeV. *The European Physical Journal C*, 79(2). doi:10.1140/epjc/s10052-019-6620-z
- Sirunyan, A. M. et al. (2019). Study of the $\Lambda^+ \rightarrow J/\psi \overline{p}$ decay in proton–proton collisions at $\sqrt{s} = 8$ TeV. *Journal of High Energy Physics*, 2019(12). doi:10.1007/jhep12(2019)100
- Sirunyan, A. M. et al. (2019). Search for an $L - L$ gauge boson using $Z \rightarrow 4\mu$ events in proton–proton collisions at $s = 13$ TeV. *Physics Letters B*, 792, 345–368. doi:10.1016/j.physletb.2019.01.072
- Soares, A. R., Afonso, R., Lampreia, J., Joao, J., Martins, V. C., Piedade, M., & Cardoso, S. (2019). Automatic system to count and classify bacteria based on magnetic cytometry. *IEEE Magnetics Letters*, 10, 1–5. doi:10.1109/lmag.2019.2953865
- Sousa, J., Correia, M., Pereira, R. C. et al. (2019). MTCA control and data acquisition platform for Plasma Diagnostics. *Journal of Instrumentation*, 14(11), C11025–C11025. doi:10.1088/1748-0221/14/11/c11025
- Stojanovic, M. for the CMS collaboration (2019). Measurement of anisotropic flow in XeXe collisions at 5.44 TeV with the CMS experiment. *Nuclear Physics A*, 982, 395–398. doi:10.1016/j.nuclphysa.2018.09.085
- Ström, P., Petersson, P., Rubel, M., Fortuna-Zalesna, E., Widdowson, A., & Sergienko, G. (2019). Analysis of deposited layers with deuterium and impurity elements on samples from the divertor of JET with ITER-like wall. *Journal of Nuclear Materials*, 516, 202–213. doi:10.1016/j.jnucmat.2018.11.027
- Tejero-del-Caz, A., Guerra, V., Gonçalves, D., da Silva, M. L., Marques, L., Pinhão, N., Pintasilgo, C. D., & Alves, L. L. (2019). The LisbOn KInetics Boltzmann solver. *Plasma Sources Science and Technology*, 28(4), 043001. doi:10.1088/1361-6595/ab0537
- Tomassetti, N., Barão, F., Bertucci, B., Fiandrini, E., & Orcinha, M. (2019). Numerical modeling of cosmic-ray transport in the heliosphere and interpretation of the proton-to-helium ratio in Solar Cycle 24. *Advances in Space Research*, 64(12), 2477–2489. doi:10.1016/j.asr.2019.06.025
- Tuccori, N., Pinheiro, T., Peña, T., Alves, L. C., Botelho, M. J., Raimundo, J., & Vale, C. (2019). Modelling the uptake of suspended materials and salts in nearshore waters by plastics using nuclear microscopy and depth profiling analytical tools. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms*, 451, 127–134. doi:10.1016/j.nimb.2019.05.036
- Tu, Z. (2019). Search for the chiral magnetic effect at the LHC with the CMS experiment. *Nuclear Physics A*, 982, 527–530. doi:10.1016/j.nuclphysa.2018.08.032
- Vargas, J. F., Lopez, B., Panesi, M., & Lino Da Silva, M. (2019). Refitting of ro-vibrational specific CO₂ radiation database to vibrationally specific. *AIAA Scitech 2019 Forum*. doi:10.2514/6.2019-1779
- Vasilopoulou, T. et al. (2019). Improved neutron activation dosimetry for fusion. *Fusion Engineering and Design*, 139, 109–114. doi:10.1016/j.fusengdes.2019.01.002

Vicente, J., Silva, F. D., Ribeiro, T. et al. (2019). Synthetic conventional reflectometry probing of edge and scrape-off layer plasma turbulence. *Journal of Instrumentation*, 14(10), C10043–C10043. doi:10.1088/1748-0221/14/10/c10043

Vidal, C., Luís, R., Pereira, B., Ferreira, et al. (2019). Thermo-structural analyses of the in-vessel components of the ITER collective Thomson scattering system. *Fusion Engineering and Design*, 140, 123–132. doi:10.1016/j.fusengdes.2019.02.048

Vygranenko, Y., Fernandes, M., Vieira, M., Lavareda, G., Nunes de Carvalho, C., Brogueira, P., & Amaral, A. (2019). Conducting indium oxide films on plastic substrates by plasma enhanced reactive thermal evaporation. *Thin Solid Films*, 691, 137604. doi:10.1016/j.tsf.2019.137604

Vygranenko, Y., Vieira, M., Lavareda, G., Nunes de Carvalho, C., Brogueira, P., Amaral, A., Barradas, N. P., & Alves, E. (2019). Optical and photoconductive properties of indium sulfide fluoride thin films. *Thin Solid Films*, 671, 49–52. doi:10.1016/j.tsf.2018.12.019

Wang, Q. (2019). Multiparticle correlations and higher order harmonics in pPb collisions at $\sqrt{s_{NN}}=8.16\text{TeV}$. *Nuclear Physics A*, 982, 375–378. doi:10.1016/j.nuclphysa.2018.09.064

Weikum, M. K. et al. (2019). EuPRAXIA: A compact, cost-efficient particle and radiation source.

25th international conference on the application of accelerators in research and industry. doi:10.1063/1.5127692

Weikum, M. K. et al. (2019). Status of the Horizon 2020 EuPRAXIA conceptual design study. *Journal of Physics: Conference Series*, 1350, 012059. doi:10.1088/1742-6596/1350/1/012059

Williams, G. O., Chung, H.-K., Künzel, S. et al. (2019). Impact of free electron degeneracy on collisional rates in plasmas. *Physical Review Research*, 1(3). doi:10.1103/physrevresearch.1.033216

Williams, G. O., & Fajardo, M. (2019). Density-functional-theory calculations of the optical properties of Al₂O₃: From solid-state to warm dense matter conditions. *High Energy Density Physics*, 33, 100718. doi:10.1016/j.hedp.2019.100718

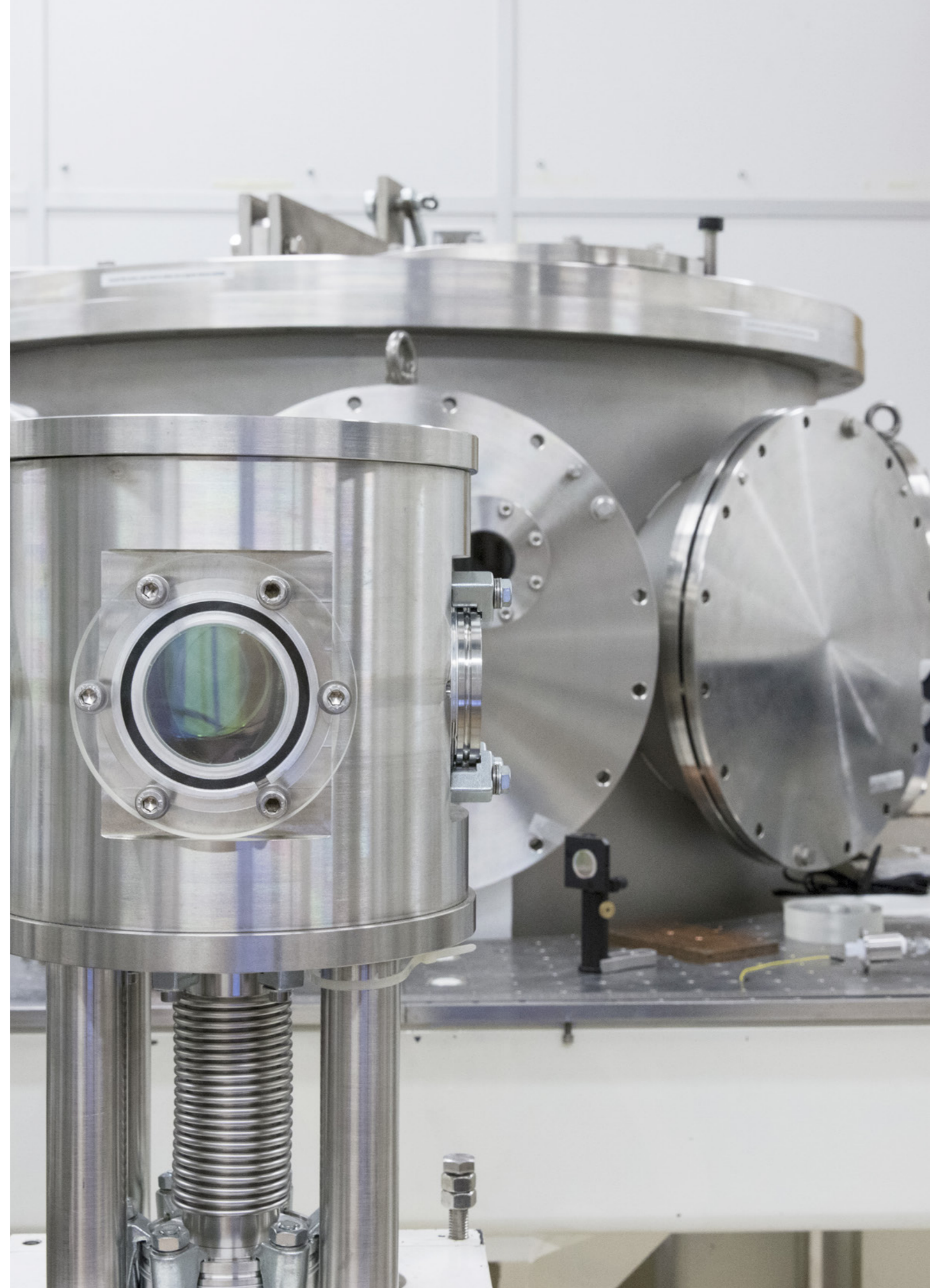
Yu, W. C., Sacramento, P. D., Li, Y. C., Angelakis, D. G., & Lin, H.-Q. (2019). Detection of topological phases by quasilocal operators. *Physical Review B*, 99(11). doi:10.1103/physrevb.99.115113

Zheng, C. et al. (2019). Magnetoresistive sensor development roadmap (non-recording applications). *IEEE Transactions on Magnetics*, 55(4), 1–30. doi:10.1109/tmag.2019.2896036

BOOKS

Horley, P., Gonçalves Ribeiro, P. J., Aguilar Martínez, J. A., & Rocha Vieira, V. J. (2019). *Semiconductor Fundamentals. Semiconductors*, 1–35. doi:10.1007/978-3-030-02171-9_1

Silvestre, A. J. & Cortez, P. I. (2019). *Mecânica - Uma Introdução* (Third edition). Gradiva. ISBN: 9789896168858





SCIENCE AND SOCIETY



A concert at the 49th International Physics Olympiad which took place in Lisbon, in July 2018.

The Department of Physics (DF) is strongly committed to promote scientific literacy in the society and to engage the young in pursuing careers in science, technology, engineering, arts and mathematics, particularly in physics and engineering physics related subjects. Many faculty have an important role in the dissemination of knowledge to society, either scientifically or in outreach activities; scientifically, by publishing in peer reviewed journals and by serving as members of editorial boards, of conference/workshop committees, and of professional societies with selected membership; in outreach activities, as active organizers and participants of widespread events, as speakers in talks for high-school students and for the general public, as coordinators/members of communication bodies and educational projects, as authors of books and press articles for the general public, and as authors/participants in programmes

and interviews broadcasted via TV, Radio, internet or in printed media.

The DF is also increasing its links to industry and companies, with the help of the network of Alumni and of those Research Units more oriented towards technologies and physics applications. With these links, we reinforce the possibilities for placing our students in temporary internships and we bridge the gap between research and society.

The following is a selection of regular outreach activities involving the DF, presented per chronological order of the events along the year, that ends with the statistics of visits to secondary schools during the period reported. This period was particularly special for the DF, because in 2018 and in 2019 the MEFT has reached the top of the choices of the students applying for higher education studies in portuguese universities.



Top: An INESC-MN event at the 2018 edition of Keep in Touch.
Bottom (left and right): NFIST's "XXI Semana da Física".

PHYSICS OLYMPIADS

Since 2010 and until 2018, the regional phase of the southern Physics Olympiads took place at IST/Taguspark, in a co-organization by the Portuguese Physics Society and the DF. In these Olympiads, students from schools can compete at two levels to solve theoretical problems and an experimental problem: the A-level (9th grade; groups of up to three students) and the B-level (11th grade, individual competition). In 2018 the regional Physics Olympics happened on May 5th and had the participation of 43 teams (125 students) at the A-level and 127 students at

the B-level. This was a record of participation, motivated by the realization in Portugal of the 49th International Physics Olympiad.

In addition to the students, we have also welcomed nearly 80 accompanying teachers, who have followed an outreach seminar while the students were doing the exams. In 2018 we acknowledge Paulo Freitas (INL, INESC-MN) and Susana Freitas (IST, INESC-MN), who spoke about "Nanoengineering and societal challenges" and "Make Engineering in a chip" respectively.

IST DAY: KEEP IN TOUCH

In 2018 and 2019, the DF joined the celebrations of IST's Day, and the corresponding "Keep In Touch" activities proposed by IST.

In 2018, the DF setup a laboratory room with the pendulum experiment, in an old and in a modern form, in which the visitors could operate the equipment to measure the acceleration of gravity, as some of them did decades ago. Five posters were also prepared and presented on the day (one poster per scientific area of the DF). NFIST has also setup part of the Physics Circus activities in the laboratory room.

In 2019, the DF featured a LIP Spark Chamber for the detection and visualization of cosmic rays, a virtual reality system (from IPFN), showed how to make engineering on a chip (INESC-MN), among other activities carried out in the main entrance hall of the Pavillion of Mathematics/Physics. NFIST has also setup part of the Physics Circus activities in room closest to the entrance. The posters of the scientific areas were used again in the entrance to talk about the scientific activities associated to the DF.

SUPPORT TO NFIST ACTIVITIES

The DF supports NFIST – Núcleo de Física do IST – the association of physics' students at IST, and both institutions are involved in several joint activities.

The DF supported the organization of the NFIST's 21st and 22nd "Semana da Física", from the 19th to the 23rd of February, 2018 and from the 18th to the 23rd of February 2019, respectively,

which attracted more than 2500 students from basic and secondary schools each year, and the organization of NFIST's 5th and 6th "Jornadas de Engenharia Física" (JEF) on the 26th and 27th of February, 2018 and on February, 28th and 1st of March, 2019, respectively.



A meeting of the international board of the Physics Olympiad in Lisbon.

MEFT: CHALLENGING THE LIMITS OF SCIENCE AND TECHNOLOGY

The 7th and 8th Workshops to promote the MEFT to high-school students, especially those in the twelfth-grade, took place at IST on June 2018 and June 2019, respectively, right after the last national exams. Since 2012, the DF and the MEFT Coordination co-organize this two-days' workshop (meft-desafiarlimites.weebly.com) that brings to the audience many hot topics in very short talks (10 minutes), showcasing the best of the DF and of the different activities carried out by MEFT alumni. The workshop includes also

visits to the laboratories of the DF and its associated research units. During the workshop the students pose questions of both scientific and practical nature, related with physics and the physics course at IST. This key activity has helped shaping the profile of the candidates to MEFT and has greatly contributed to the increase in the minimum grade to access the course. The number of participants was 79 (39 women and 40 men) in 2018, and 56 (22 women and 34 men) in 2019.

IPHO 2018/ 49TH INTERNATIONAL PHYSICS OLYMPIAD

The Portuguese Physics Society was responsible for the organization of the 49th International Physics Olympiad, in Lisboa from 21st to the 28th of July. It was a very complex operation involving about 1000 people. The organizing committee comprised people from several Portuguese universities, coordinated by Chairperson José António Paixão from the University of Coimbra. The DF/IST was in charge of the Local Organizing Committee, and IST was home to the operational secretariat, all exams preparations, meetings of the International Board (about 250 dele-

gation leaders), with the IPhO Executive Committee and with the Academic Committee, setting up the teams of correctors, and managing the moderation sessions and finalization of diplomas and certificates.

The DF/IST and IST/Taguspark were also key to the support of the preparations of the exams rooms, as IST/Taguspark provided 250 tables and chairs needed to the exams of the 400 international students.

It was a very successful international event for which the preparations started in 2016.

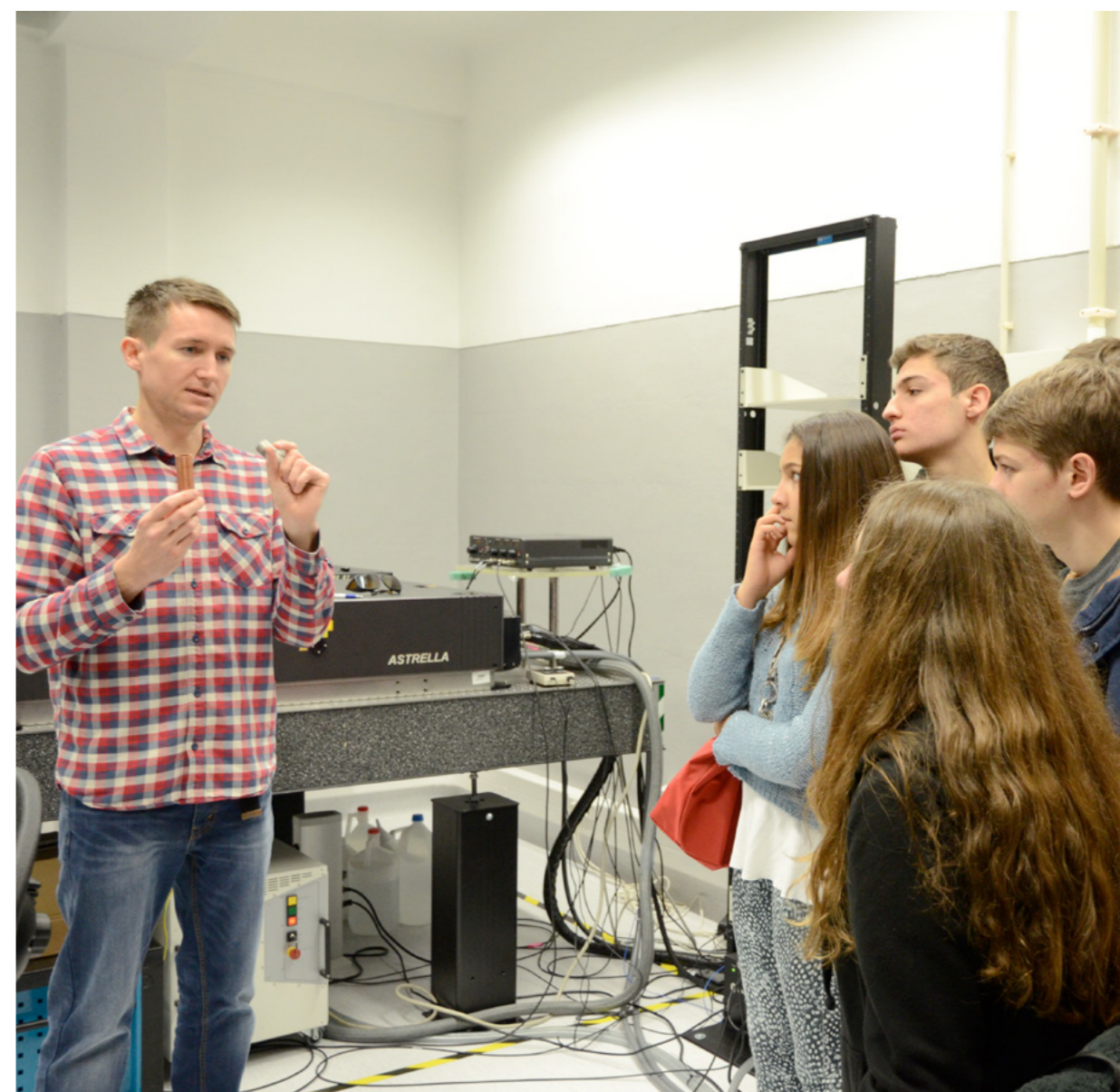
MEFT: EXTENDING THE LIMITS OF SCIENCE AND TECHNOLOGY

The DF and the MEFT Coordination launched in 2017 the Workshop MEFT – Extending the limits of Science and Technology, as part of the celebration of the 30th anniversary of MEFT, aiming to promote the 2nd cycle of the MEFT to the students of its 1st cycle. The event presented the numerous opportunities for research and innovation available in the five scientific areas of the DF and its associated research units, maintaining cooperation programmes with

several excellent research facilities around the world, and promoted a debate about future challenges for the MEFT. This workshop should continue to be organized every year, on the first Saturday of the first term, taking profit of the students newly arrived to MEFT. The number of participants of the second edition in 2018 was 85 (23 women and 62 men) and in 2019 did not occurred due to budget restrictions.



Prof. Luís Lemos Alves speaks at the Newtonmas closing session in 2018.



High-school students attend a demonstration during a visit to the VOXEL laboratory. Image: IPFN

NEWTONMAS

In 2016, the DF launched this very innovative event, to celebrate the 30th anniversary of the MEFT and the birthday of Isaac Newton (25 December 1642, in the Julian calendar). The Newtonmas was organized in 2018 on the afternoon and evening of Saturday, December 15th, serving also to gather the students, the faculty and the staff of the DF, in a special end-of-the-year celebration. For this celebration in 2018, the DF invited Prof. Bernard Dieny (SPINTEC, Univ. Grenoble Alpes/CEA /CNRS, France), to deliver a “IST Distinguished Lecture” on his work about “Spin electronics: From basic concepts to applica-

tions towards a greener electronics”. The celebration was closed with the announcement of several distinctions granted to the students by the DF and the Coordination of the MEFT: the Awards for Academic Excellence in the MEFT and the Distinctions for the Best Master Theses per scientific area, which included a brief presentation of the results achieved by the awardees. A total of 172 people (51 women and 121 men) participated in the event.

Unhappily, the Newtonmas could not be celebrated in 2019 due to severe budget restrictions.

VISITS FROM SCHOOLS

There are regular requests of high-schools to visit IST, which are normally handled by NAPE, the student support unit of IST. The groups requesting visits to the facilities located at the DF or its associated Research Units are handled directly by the DF (5

schools and 194 students visited the DF in 2018 and 2019). Additionally, several schools visit IST after direct contact with the Research Units or as part of the programme of NFIST’s Physics Week - “Semana da Física”, which receives about 2500 students/year.

OUTREACH SEMINARS AT SCHOOLS AND OTHER INSTITUTIONS

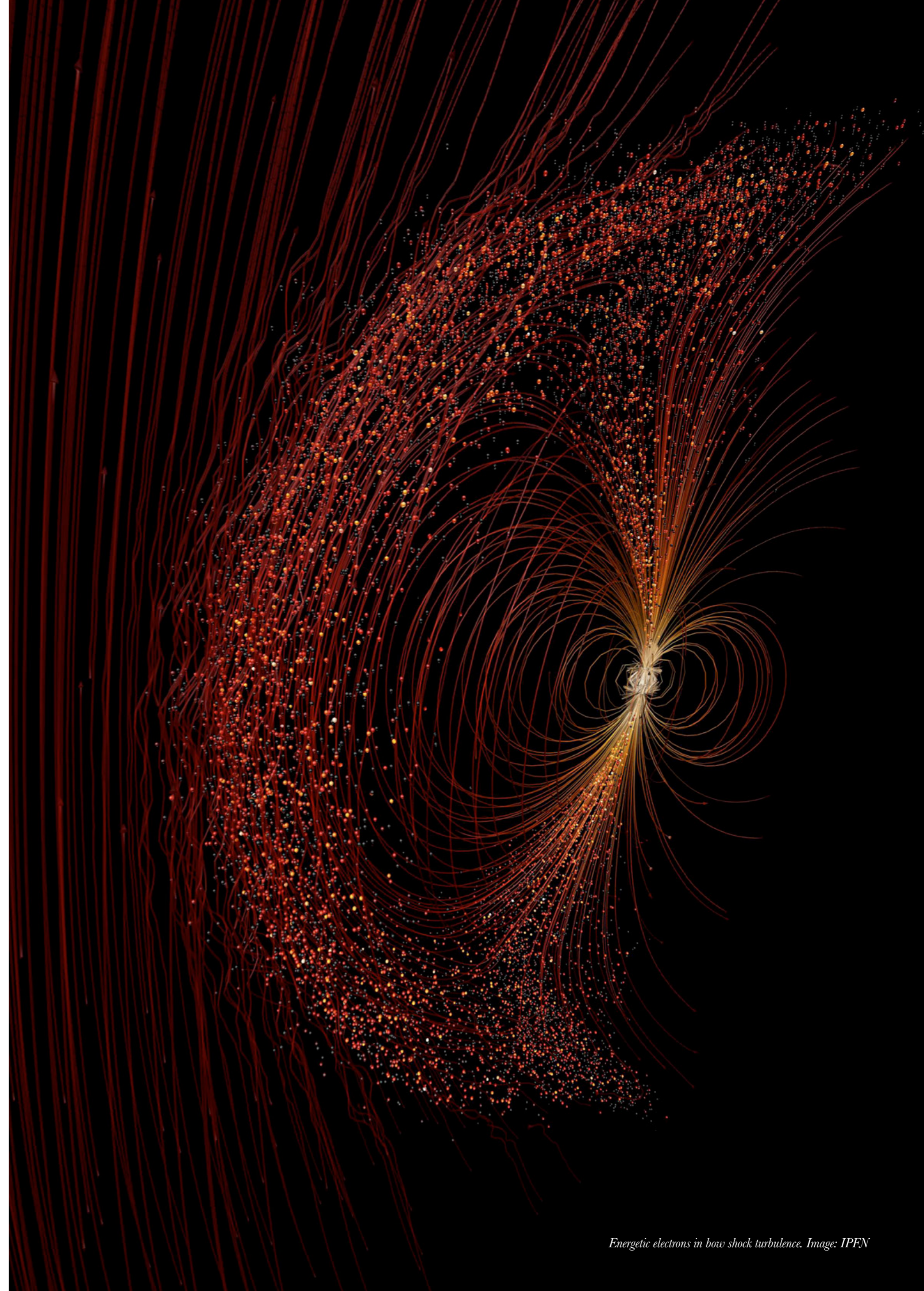
The DF faculty are well engaged with the Society and try hard to answer all the requests from schools and other institutions across the country, to receive a scientist/teacher. These visits normally include a presentation by the members of the DF on a feature hot topic, properly adapted to the group's age (between 5–18 years old), after which the students have the possibility to ask questions about physics, the IST and the MEFT.

In 2018 and 2019, more than 160 outreach/dissemination talks were delivered by members of the DF at high-schools and other institutions. Of these, about 50 talks were made in the scope of the project “Espaço vai à escola” from ESERO-Portugal.

Filipe Mendes and Pedro Brogueira designed 14 physics experiments and experimental protocols for

the project “Lab in a Box”, an initiative of the Instituto Gulbenkian de Ciência. “Lab in a Box” is, as the name implies, a box containing about 30 materials or very common objects and the protocols for performing about 100 experiments in areas of biology, physics, chemistry and ecology. All protocols were designed to facilitate the understanding not only of the fundamental laws of physics or genetic principles, but also the scientific method, stimulating curiosity and critical thinking of students of different educational levels and ages. The boxes were delivered to 50 schools in Cape Verde. Two training actions were also provided to the teachers in Cape Verde (Cidade da Praia and Mindelo) in order to prepare them to receive the boxes, perform the experiments and do their maintenance.

Pedro Abreu at Escola Secundária Eça de Queirós, in Lisbon, on 18 October 2018.





FACULTY AND STAFF

ACKNOWLEDGMENT TO COLLABORATORS

The heart of the DF is composed by its faculty (with both permanent and invited members), collaborators, and administrative and technical staff. These are people that give live to the department, contributing to its success.

IN 2018/2019 THE FOLLOWING FACULTY WERE RECRUITED AND/OR PROMOTED:

Guilherme Milhano, *Associate Professor*
 João Pedro Bizarro, *Associate Professor*
 Patrícia Gonçalves, *Associate Professor*
 Patrícia Conde Muiño, *Assistant Professor*
 Pedro Ribeiro, *Assistant Professor*
 Jorge Vieira, *Assistant Professor*

THE FOLLOWING FACULTY LEFT THE DF:

Carlos Herdeiro, *Associate Professor*
 (Moved to UAveiro)
 Maria Manuela de Sousa Mendes,
Assistant Professor (Retired in 2019)

We thank their dedication and ongoing commitment to the success of the DF, during the years of service.

THE DF ALSO THANKS ITS COLLABORATORS IN 2018/2019:

Amílcar José Ferros Praxedes
 André Lopes
 Angela Mecca
 Antonio Tejero-Del-Caz
 António Samuel Ávila Balula
 Carlos Augusto Santos Silva
 Daniele Vernieri
 David Mathew Hilditch
 Diogo Bragança
 Diogo da Silva Duarte Cruz
 Domenica Corona
 Eduardo Jorge Da Costa Alves
 Elena Stefanova Tatarova
 Fábio Cruz
 Gareth Oisín Williams
 Gonçalo Quinta
 Henrique Leal
 João Carlos Nogueira de Brito Fortunato
 João Daniel Marques Rodrigues
 João Luis de Figueiredo Rosa
 João Vargas
 Jorge Lopes
 José Manuel das Neves Rodrigues
 José Maria Vargas Lopes

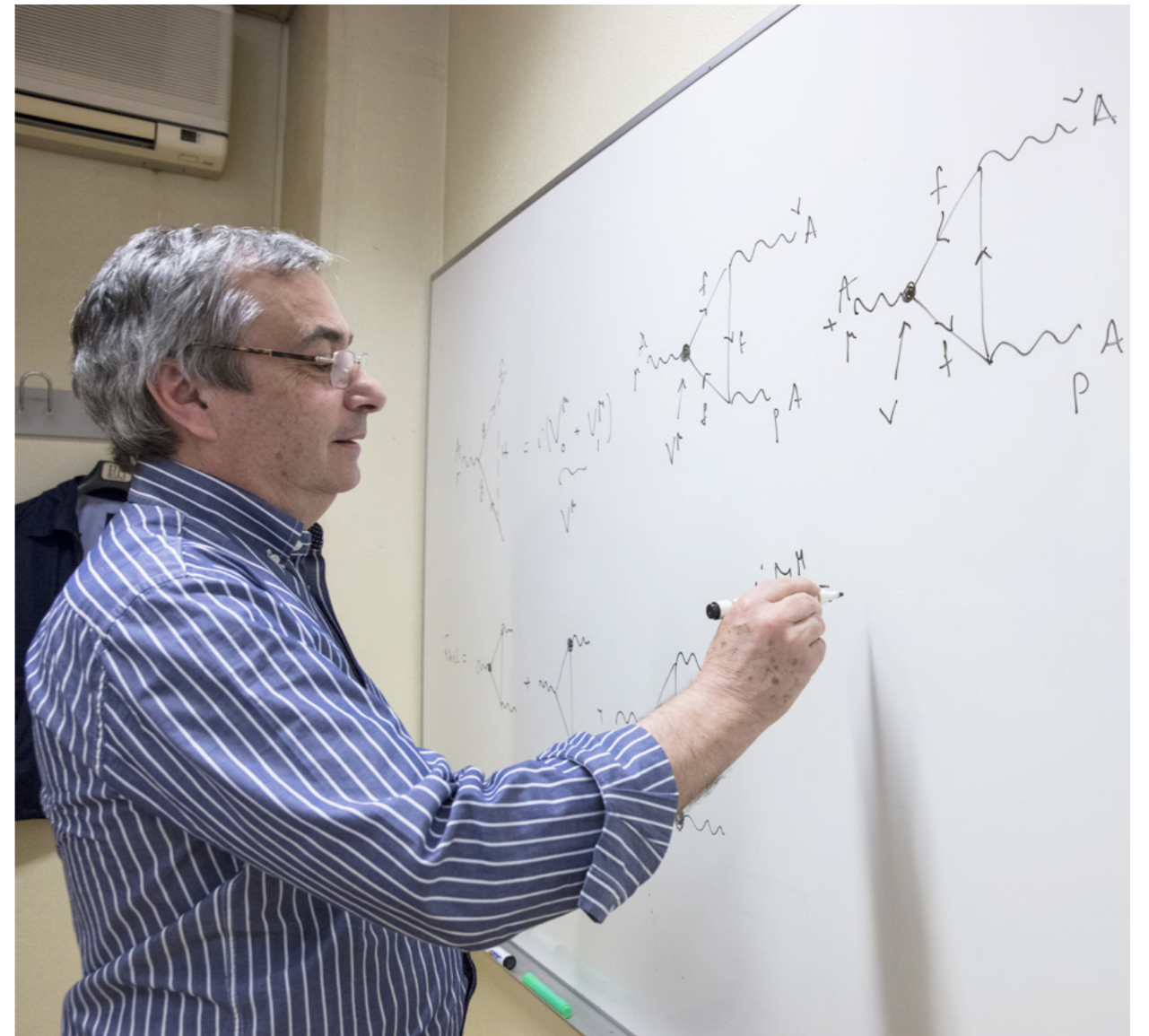
Katharina Lorenz
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 Maria Teresa Ferreira Marques Pinheiro
 Miguel Alexandre Ribeiro Correia
 Miguel Reis Orcinha
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 Sofia Isabel Cardoso de Almeida Leitão
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 Vânia Cristina Henriques Silvério
 Victoria Corregidor Berdasco

LIST OF FACULTY AND STAFF

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 Alfred Stadler
 Amaro José Rica da Silva
 Ana Maria Guerreiro Martins
 Ana Maria Heleno Branquinho de Amaral
 Ana Maria O. de Noronha e Menezes da Costa
 Ana Maria Vergueiro Monteiro Cidade Mourão
 Ana Neves Vieira da Silva
 André David Tinoco Mendes
 António Jorge Duarte de Castro Silvestre
 António Mário Pereira Ferraz
 Artur Jorge Louzeiro Malaquias
 Bernardo António Neto Gomes Baptista Tomé
 Bernardo Brotas de Carvalho
 Bruno Miguel Santos Mera
 Carlos Manuel dos Santos Rodrigues da Cruz
 David Hilditch
 David Pacheco Resendes
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 Elmar Peter Biernat
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 João Carlos Carvalho de Sá Seixas
 João Carlos Ferreira Fernandes
 João Filipe de Barros Duarte Fonseca
 João Luís Maia Figueirinhas
 João Manuel Coelho dos Santos Varela
 João Paulo Ferreira da Silva
 João Pedro Saraiva Bizarro
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 Mário José Gonçalves Pinheiro
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 Nuno Miguel Ribeiro Cardoso
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 Patrícia Carla Serrano Gonçalves
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 Pedro Domingos Santos do Sacramento
 Pedro Jorge dos Santos Assis
 Pedro José de Almeida Bicudo
 Pedro José Gonçalves Ribeiro
 Pedro José Oliveira Sebastião
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TENURE-TRACK/TENURE INVESTIGATORS

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 Pedro Nuno da Silva Claro
 Sandra Cristina Gonçalves de Oliveira dos Santos
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FACULTY



Alfred Stadler

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

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Research area & interests:

Alfred Stadler's research activities are focused on the theory of strongly interacting particles. In particular, he has developed a relativistic model of the interaction between two nucleons (neutrons and protons), and has shown, by solving the corresponding relativistic three-nucleon equations exactly, that they lead to an accurate description of the three-nucleon bound states (the light nuclei tritium and helium-3). Currently he investigates the structure of mesons as relativistic quark-antiquark bound states. He teaches physics at the University of Évora and has supervised two Masters and two PhD theses.

Selected References:

Leitão, S., Stadler, A., Peña, M., & Biernat, E. P. (2017). Covariant spectator theory of quark-antiquark bound states: Mass spectra and vertex functions of heavy and heavy-light mesons. *Physical Review D*, 96(7). doi:10.1103/physrevd.96.074007.

Gross, F., & Stadler, A. (2008). Covariant spectator theory of np scattering: Phase shifts obtained from precision fits to data below 350 MeV. *Physical Review C*, 78(1). doi:10.1103/physrevc.78.014005.

Stadler, A., & Gross, F. (1997). Relativistic calculation of the triton binding energy and its implications. *Physical Review Letters*, 78(1), 26-29. doi:10.1103/physrevlett.78.26.



Amaro J. Rica da Silva

Assistant Professor

Area: Astrophysics & Gravitation

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Research area & interests:

Amaro Rica da Silva works in mathematical methods for the representation of the multi-hierarchical structure of physical systems. He is interested in the analysis of data using wavelets instead of the more usual harmonic analysis. Lately he has invested in learning and use of Deep Learning Neural Networks for the solution of complex physical problems in astronomy and astrophysics and other areas of physics. He is also invested in geometrical modelling of classical and relativistic collisions and the general slingshot processes that can occur. He is also developer of a software package for the use of all faculty to enable creation and upload of online content that facilitates the use of IST's remote evaluation platform in Fenix.

Selected references:

R. da Silva, A. J., & Lemos, J. P. (2008). Binary collisions and the slingshot effect. *Celestial Mechanics and Dynamical Astronomy*, 100(3), 191–208. doi:10.1007/s10569-007-9114-5.

R. da Silva, A. Galois Groups in the work of Mira Fernandes (2010-2011). *Boletim da Sociedade Portuguesa de Matemática*, Numero Especial – Aureliano Mira Fernandes: 125–145. <http://adsabs.harvard.edu/abs/2011arXiv1101.1618J>.

Jorge, P., R. da Silva, A., and Lopes, I. (2006). Pulsating spectrum of subdwarf star PG 1605+072: Comparative time-frequency analysis via wavelet packet and local sine packet transforms of an interrupted light curve. *The Astrophysical Journal*, 647(1), 564–572. doi:10.1086/504461.



Ana Branquinho de Amaral

Assistant Professor

Area: Condensed Matter & Nanotechnology

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Research area & interests:

The work of Ana Branquinho de Amaral is focused on the optimization of micro-electronics devices and photovoltaic cells. To accomplish this objective several types of semiconducting, insulating and conducting materials are deposited and characterized. Her research envisage both the fundamental understanding of the materials physical properties and the exploration of their potential for the development of applications with technological impact. Presently she is also interested on the deposition of amorphous silicon films on graphene substrates to study the damages caused by plasma during deposition in order to use graphene material as a TCO in amorphous silicon solar cells or in photo-sensors.

Selected references:

Ricardo, L., Amaral, A., Nunes de Carvalho, C., & Lavareda, G. (2016). Dopant transfer from poly-si thin films to c-Si: an alternative technique for device processing. *Materials Science in Semiconductor Processing*, 42, 210–214. doi:10.1016/j.mssp.2015.09.006.

Fernandes, M., Vygranenko, Y., Vieira, M., Lavareda, G., Carvalho, C. N., & Amaral, A. (2016). Automated rf-PERTE system for room temperature deposition of TCO coatings. *Energy Procedia*, 102, 96–101. doi:10.1016/j.egypro.2016.11.323.

Amaral, A., Lavareda, G., Nunes de Carvalho, C., André, V., Vygranenko, Y., Fernandes, M., & Brogueira, P. (2018). Etchability dependence of InOx and ITO thin films by plasma enhanced reactive thermal evaporation on structural properties and deposition conditions. *MRS Advances*, 3(04), 207–212. doi:10.1557/adv.2018.113.



Ana M. Martins

Assistant Professor

Area: Condensed Matter & Nanotechnology

PhD: Universidade de Lisboa, 1987.

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Selected references:

Martins, A. M. (2015). Necessary and sufficient conditions for local unitary equivalence of multi-qubit states. *Physical Review A*, 91(4). doi:10.1103/physreva.91.042308.

Martins, A. M. (2008). Minimization of a quantum automaton: The transducer. *Physical Review A*, 78(6). doi:10.1103/physreva.78.062326.

Mendonça, J. T., Guerreiro, A., & Martins, A. M. (2000). Quantum theory of time refraction. *Physical Review A*, 62(3). doi:10.1103/physreva.62.033805.



Ana Maria Mourão

Associate Professor

Area: Astrophysics & Gravitation

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Research area & interests:

A. Mourão has been participating in several international efforts related to the use of supernovae to understand the nature of dark energy and the accelerated expansion of the Universe. The current constraints on the nature of the dark energy from supernovae can only be greatly improved with a much better control of systematics, such as the extinction in host galaxies, evolutionary effects or host galaxy properties. She is now studying supernova host galaxies using wide field integral spectroscopy. She is also using the FORS2 instrument at the ESO Very Large Telescope in Paranal, Chile, to measure the polarization of the light from the galaxies to infer the properties of the dust in supernova host galaxies. AM has been responsible for the DEMO – Demonstrations laboratory. The aim of this Laboratory is to provide experimental support for the lectures courses in physics. She was awarded with the diploma “Excellency in teaching” in 2016 and 2017.

A. Mourão was the responsible at Executive Commission of the Department of Physics for the contacts with media, press releases and outreach. She was the responsible for the publication of the first Report of

the DF (2016), the annual meeting “Newtonmas” (2016). As Vice-President at CENTRA – Center for Astrophysics & Gravitation at the IST, she was responsible for various press-releases and production of videos covering scientific discoveries, namely related to the discovery of gravitational waves (<https://www.youtube.com/watch?v=w8EIXKL6IGU>) and the Nobel prizes in Physics 2017.

Selected references:

Astier, P. et al. (2006). The supernova legacy survey: measurement of Ω_M , Ω_Λ and w from the first year data set, *Astronomy and Astrophysics*, Volume 447, Issue 1, pp.31–48; doi:10.1051/0004-6361/20054185

Galbany, L., Stanishchev, V., Mourão, A. M. et al. (2016). Nearby supernova host galaxies from the CALIFA survey. *Astronomy and Astrophysics*, 591, A48. doi:10.1051/0004-6361/201528045

Stanishchev, V., Rodrigues, M., Mourão, A. M., & Flores, H. (2012). Type Ia supernova host galaxies as seen with IFU spectroscopy. *Astronomy and Astrophysics*, 545, A58. doi:10.1051/0004-6361/201219188



André David

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

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Research area & interests:

André David is a CERN staff physicist presently working on designing and building the high-granularity calorimeter for the upgraded CMS experiment at the high-luminosity LHC. He was convener of the CMS Higgs physics group from 2015 to 2017. He has over 50 papers with direct contributions, including articles from the CMS, NA60, and CLOUD collaborations. André was awarded the CMS Young Researcher prize in 2013 for “sustained and critical contributions to the preparation and commissioning of the electromagnetic calorimeter; to the search of the Higgs boson in its decay to photons, and to the combination of results from its various decay modes”.

André David is active in engaging the public and in broadening the reach of high-energy particle physics. He organised the first CERN School Philippines in 2014 and regularly hosts schools, students, and teachers in the CERN-related academic and non-academic programmes.

Selected references:

Chatrchyan, S., Khachatryan, V., Sirunyan, A. M., et al. (2012). Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC. *Physics Letters B*. 716. 30–61. doi:10.1016/j.physletb.2012.08.021.

Kirkby, J., Curtius, J., Almeida, J., et al. (2011). Role of sulphuric acid, ammonia and galactic cosmic rays in atmospheric aerosol nucleation. *Nature* 476. 429–33. Times cited: 476. doi:10.1038/nature10343

Arnaldi, R., Averbeck, R., Banicz, K., et al. (2006). First measurement of the ρ spectral function in high-energy nuclear collisions. *Physical Review Letters* 96.162302. Times cited: 251. doi:10.1103/PhysRevLett.96.162302



António Ferraz

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Research area & interests:

António Ferraz studies the molecular dynamics of liquid crystalline materials, using Nuclear Magnetic Resonance techniques. He was awarded the “Excellent Teacher” distinction at IST in 2016 and 2017.

Selected references:

Rogalski, M. S. and Ferraz, A. (2011). *Física para engenheiros*. Escolar Editora, ISBN 978-972-592-314-6.

Ferraz, A., Zhang, J., Sebastião, P. J., Ribeiro, A. C., & Dong, R. Y. (2014). Proton and deuterium nuclear spin relaxation study of the SmA and SmC* phases of BP8Cl-d17: A self-consistent analysis. *Magnetic Resonance in Chemistry*, 52(10), 546–555. doi:10.1002/mrc.4107.

Fernandes, J.C., Sebastião, P.J., Gonçalves, L. and A. Ferraz (2017). Study of large-angle anharmonic oscillations of a physical pendulum using an acceleration sensor. *European Journal of Physics*, 38(4), 045004. doi:10.1088/1361-6404/aa6c52.



António Jorge Silvestre

Associate Professor

Area: Condensed Matter & Nanotechnology

PhD: Universidade de Lisboa, 1997.

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Research area & interests:

António Jorge Silvestre is member of the Center of Physics and Engineering of Advanced Materials (CeFEMA). His current scientific interests include the deposition of functional oxide thin films (e.g. CrO₂, Fe₃O₄, transition metal doped TiO₂ and SnO₂) by chemical and physical methods, and their structural, optical, electrical and magnetic characterization. He has been also interested on the synthesis of nanostructured materials by chemical routes with potential application on photocatalysis for the degradation of organic pollutants. He co-authored of 1 book on mechanics and has published 40 papers in international journals and several other research papers in proceedings of international conferences and on educational physics subjects. He and was awarded the “Excellent Teacher” distinction at IST in 2018 and 2019.

António Jorge Silvestre has been Secretary of the Fiscal Council of the Portuguese Society of Physics and enrolled in outreach events such as the “European Researchers’ Night”. He is currently reviewer for numerous leading journals, having received certificates of outstanding contribution in reviewing from several Elsevier journals.

Selected references:

Entradas, T., Cabrita, J., Dalui, S., Nunes, M., Monteiro, O., & Silvestre, A. (2014). Synthesis of sub-5 nm Co-doped SnO₂ nanoparticles and their structural, microstructural, optical and photocatalytic properties. *Materials Chemistry and Physics*, 147(3), 563–571. doi:10.1016/j.matchemphys.2014.05.032.

Pereira, L. C., Nunes, M. R., Monteiro, O. C., & Silvestre, A. J. (2008). Magnetic properties of co-doped TiO₂ anatase nanopowders. *Applied Physics Letters*, 93(22), 222502. doi:10.1063/1.3036534.

Conde, O., Silvestre, A., & Oliveira, J. (2000). Influence of carbon content on the crystallographic structure of boron carbide films. *Surface and Coatings Technology*, 125(1–3), 141–146. doi:10.1016/S0257-8972(99)00594-0.



Artur Malaquias

Assistant Professor

Area: Plasma Physics, Lasers & Nuclear Fusion

PhD: 2000

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Research area & interests:

Artur Malaquias leads the ISTTOK Heavy Ion Beam Diagnostic experiment working in collaboration with Senior Researchers and PhD Students. The latest developments implemented were aiming at open the possibility of measuring the ISTTOK plasma potential together with plasma pressure and poloidal magnetic field. It is expected that these improvements can provide more precise and closely correlated data to support fusion plasma simulations. In the field of international collaborations he works for the ITER project as responsible for projects related to the development of x-ray diagnostic detectors. He is also an ITER Science Fellow. He also was responsible for the integration team of microwave diagnostics in DEMO.

Artur Malaquias has a cumulative participation in over 80 international conferences and was Scientific Secretary in circa 20 IAEA Conferences and Technical meetings. He gave seminars in the University of Graz (Austria) and at the Liceu Sá da Bandeira (Santarém, Portugal).

Selected references:

Sharma, R., Nedzelskiy, I. S., Malaquias, A., Henriques, R.B. (2017). Design and optimization of the electrostatic input module for the ISTTOK Tokamak HIBD cylindrical energy analyzer. *Journal of Instrumentation*, Volume 12, November 2017 doi:10.1088/1748-0221/12/11/C11018.

W. Biel et al. (2019). Diagnostics for plasma control: from ITER to DEMO. *Fusion Engineering and Design*, Volume 146, Part A, 2019, Pages 465–472, ISSN 0920-3796. doi:10.1016/j.fusengdes.2018.12.092.

Malaquias, A., Henriques, R., Silva, C., Figueiredo, H., Nedzelskiy, I., Fernandes, H., ... Plyusnin, V. (2017). Investigation of the transition of multicycle AC operation in ISTTOK under edge electrode biasing. *Nuclear Fusion*, 57(11), 116002. doi:10.1088/1741-4326/aa7c9c.



Bernardo Tomé

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

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Research area & interests:

Bernardo Tomé has been teaching the laboratory component of the course “Radiation Physics”, has been co-responsible for the course “Design and Simulation of Radiation Detectors” and responsible for the course “Simulation Methods for Particle Detectors”.

Selected references:

Aab, et al., Studies on the response of a water-Cherenkov detector of the Pierre Auger Observatory to atmospheric muons using an RPC hodoscope, accepted for publication in *JINST*, <http://arxiv.org/abs/2007.04139>.

Assis, P., Barres de Almeida, U., Blanco, A., Conceição, R., D’Ettore Piazzoli, B., De Angelis, A., Doro, M., Fonte, P., Lopes, L., Matthiae, G., Pimenta, M., Shellard, R., Tomé, B. (2018). Design and expected performance of a novel hybrid detector for very-high-energy gamma-ray astrophysics. *Astroparticle Physics*, vol. 99, pp. 34–42. doi:10.1016/j.astropartphys.2018.02.004.

Abreu, P. et al. (2018). MARTA: A high-energy cosmic-ray detector concept with high-accuracy muon measurement, *European Physical Journal C* 78 333. doi:10.1140/epjc/s10052-018-5820-2.



Bruno Mera

Invited Assistant Professor

Area: Condensed Matter & Nanotechnology

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Research area & interests:

Bruno Mera's research focuses mostly on quantum matter and the study of the geometrical and topological structures which capture the underlying physics. These mathematical structures also have a quantum information interpretation and this is another point of view within his research. Lately, he has also been applying classical information geometry methods towards the problem of model selection in the context of high dimensional vector data but with small amount of instances. He has published 13 papers in international journals. He is currently supervising 3 MSc students and 1 PhD student that has recently submitted the thesis.

Bruno Mera was involved in the project Academia de Verão 2017 organized by Tree Tree 2, where he has given two lectures on physics for highly motivated young high school students. Bruno Mera has also given an interview for the American Physical Society's online magazine Physics regarding his work on topological quantization of work. He has also given an interview to the IST news regarding this same contribution. Bruno Mera is one of the organizers of the multidisciplinary seminar series Quantum Matter meets Maths.

Selected references:

Mera, B. (2020). Localization anisotropy and complex geometry in two-dimensional insulators. *Physical Review B* 101: 11518. doi:10.1103/PhysRevB.101.115128.

Mera, B., Sacha, K., and Omar, Y. (2019). Topologically protected quantization of work. *Physical Review Letters* 123.2: 020601. doi:10.1103/physrevlett.123.020601.

Mera, B., Vlachou, C., Paunković, N. and Vieira, V. R. (2017). Uhlmann connection in fermionic systems undergoing phase transitions. *Physical Review Letters* 119.1: 015702. doi:10.1103/PhysRevLett.119.015702.



Bruno Soares Gonçalves

Principal Investigator with "Agregação"

Area: Plasma Physics, Lasers & Nuclear Fusion

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Research area & interests:

Bruno Soares Gonçalves is the President of Instituto de Plasmas e Fusão Nuclear (since May 2012) and Head of the Group of Engineering and Systems Integration (since 2013). Bruno Gonçalves was responsible for several international projects (and presently is the responsible for the ITER Plasma Position Reflectometer Project, for the Portuguese contribution to the ITER Collective Thomson Scattering Diagnostics (lead by DTU), responsible for the Portuguese Participation in the Fusion Programme (through the EURATOM co-funded action carried out by the consortium Eurofusion) and is the responsible for the management of the research unit FCT funding. He has particular scientific interest in plasma turbulence, in the development of diagnostics and control and data acquisition systems for fusion devices.

Bruno Soares Gonçalves (h-index: 22) is co-inventor of one submitted patent, co-author of one chapter in a book, of 100 articles published in international peer-reviewed journals, 58 (fifty-eight) articles published in conference proceedings. He co-supervised 5 Master students and he is co-supervisor of 3 PhD students.

Bruno Soares Gonçalves has given 15 outreach seminars at high-schools and in public sessions, moderated 1 debates about science and participated in 6 outreach events.

Selected references:

Goncalves, B., Hidalgo, C., Pedrosa, M. A., et al. (2003). Edge localized modes and fluctuations in the JET SOL region. *Plasma Physics and Controlled Fusion*, 45(9), 1627–1635. doi:10.1088/0741-3335/45/9/305

Gonçalves, B., Hidalgo, C., Pedrosa, M. A., et al. (2006). Role of turbulence on edge momentum redistribution in the TJ-II stellarator. *Physical Review Letters*, 96(14). doi:10.1103/physrevlett.96.145001.

Goncalves, B., Sousa, J., Carvalho, B. B., et al. (2012). ITER fast plant system controller prototype based on ATCA platform. *Fusion Engineering and Design*, 87(12), 2024–2029. doi:10.1016/j.fusengdes.2012.04.005



Carlos Cruz

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Research area & interests:

Carlos R. Cruz is the Coordinator of the Complex Fluids NMR and Surfaces Group of CeFEMA (Center of Physics and Engineering of Advanced Materials). His research work is mainly focused on Liquid Crystals Experimental Physics with particular emphasis on NMR and X-ray diffraction studies.

In recent years he has been team-leader in two European Projects on Liquid Crystal Dendrimers. He has published 36 papers in international journals and a book on NMR of Liquid Crystal Dendrimers. He was awarded the “Excellent Teacher” distinction at IST in 2014. He was vice-coordinator of the Technological Physical Engineering MSc course and member of the Pedagogical Council of IST from 2009 to 2011.

Selected references:

Cruz, C. R., Figueirinhas, J. L., Sebastião, P.J. (2016). *NMR of liquid crystal dendrimers*. Pan Stanford Publishing.

Polineni, S., Figueirinhas, J. L., Cruz, C., Wilson, D. A., & Mehl, G. H. (2013). Capacitance and optical studies of elastic and dielectric properties in an organosiloxane tetrapode exhibiting a NB phase. *The Journal of Chemical Physics*, 138(12), 124904. doi:10.1063/1.4795582.

Aluculesci, A., Vaca Chávez, F., Cruz, C., Sebastião, P.J., Nagaveni, N. G., Prasad, V., & Dong, R. Y. (2012). Proton NMR relaxation study on the nematic-nematic phase transition in A131 liquid crystal. *The Journal of Physical Chemistry B*, 116(31), 9556–9563. doi:10.1021/jp305064x.



Carlos Garcia Silva

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Research area & interests:

The research activities of Carlos Garcia Silva have been focused on edge physics, multi-scale turbulent transport and diagnostic development in fusion devices. The work is performed in devices such as ISTTOK (Portugal), AUG (Germany) and JET (UK), where he regularly participates in experimental campaigns. His research methodology combines data analysis with diagnostic operation and development. He is co-author of about 160 publications in international scientific journals with referee.

Carlos Garcia Silva gives regular talks on Nuclear Fusion and visits to the ISTTOK laboratory for high school and graduate students.

Selected references:

Gil, L., Silva C. et al. (2020) Stationary ELM-free H-mode in ASDEX upgrade. *Nucl. Fusion* 60 054003. doi:10.1088/1741-4326/ab7d1b.

Silva, C. et al. (2019). Geodesic acoustic mode evolution in L-mode approaching the L-H transition on JET. *Plasma Phys. Control. Fusion* 61 075007. doi:10.1088/1361-6587/ab1e73.

Silva, C. et al. (2018). Scaling of the geodesic acoustic mode amplitude on JET. *Plasma Phys. Control. Fusion* 60 085006. doi:10.1088/1361-6587/aac980.



David Hilditch

Invited Assistant Professor

Area: Astrophysics & Gravitation

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Research area & interests:

David Hilditch works on mathematical and numerical relativity. In particular his research is focused on the gauge freedom of general relativity, on the development of formulations suitable for numerical approximation, and on extreme spacetimes at the threshold of black hole formation. He is supervising a number of PhD students at IST (and beyond), and as an invited professor is teaching black holes and gravitational waves.

Selected references:

Baumgarte, T. W., Gundlach, C., and Hilditch, D. (2019). Critical phenomena in the gravitational collapse of electromagnetic waves. *Physical Review Letters*. 123 17, 171103. doi:10.1103/physrevlett.123.171103.

Gasperin, E., Gautam, S., Hilditch, D., and Vañó-Viñuales, A. (2020). The hyperboloidal numerical evolution of a good-bad-ugly wave equation. *Classical and Quantum Gravity* 37 3, 035006. doi:10.1088/1361-6382/ab5f21.

Gasperin, E. and Hilditch, D. (2019). The weak null condition in free-evolution schemes for numerical relativity: Dual foliation GHG with constraint damping. *Classical and Quantum Gravity*. 36 19, 195016. doi:10.1088/1361-6382/ab3f0b.



Diana C. Leitão

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Area: Condensed Matter & Nanotechnology

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Research area & interests:

Diana Leitão an expert in the design, fabrication and applications of magnetic nanostructures and thin-films. She was awarded the PhD in Physics from University of Porto (IFIMUP) in collaboration with Materials Institute of Madrid (ICMM-CSIC). She is currently an FCT Investigator Grantee at INESC Microsystems and Nanotechnologies and an Invited Assistant Professor in Instituto Superior Técnico. She has published 62 articles in peer-reviewed journals and 3 books chapters.

Diana Leitão has been actively engaged in outreach activities participating regularly in European Researchers Night, Lab tours for undergraduate and high-school students, Materials Engineering and Physics Engineering Marathons at IST.

Selected references:

Dias, C., Leitão, D. C.; Freire, C. S. R., Gomes, H., L., Cardoso, S., Ventura, J. (2020). Resistive switching of silicon-silver thin film devices in flexible substrates. *Nanotechnology* 13 (31): 135702. doi:10.1088/1361-6528/ab5eb7.

Leitão, D. C., Silva, A. V., Paz, E., Ferreira, R., Cardoso, S., Freitas, P. P. (2016). Magnetoresistive nanosensors: controlling magnetism at the nanoscale. *Nanotechnology* 27 (4): 045501. doi: 10.1088/0957-4484/27/4/045501.

Sousa, C. T., Leitão, D. C., Proenca, M. P., Ventura, J., Pereira, A. M., Araujo, J. P. (2014). Nanoporous alumina as templates for multifunctional applications. *Applied Physics Reviews* 1 (3): 031102. doi:10.1063/1.4893546.



Elmar Biernat

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Research area & interests:

Elmar Biernat studies the properties and phenomena of strongly-interacting few-body systems. In point-form relativistic quantum mechanics he has contributed to the development of a general method for calculating hadron form factors. In the Covariant Spectator Theory he has contributed to the formulation of a dynamical quark model for mesons that exhibits both confinement and spontaneous chiral-symmetry breaking. In particular, he is responsible for the first calculation of the dressed quark mass function in Minkowski space.

He has published 40 papers and he gave 40 talks (17 of which as invited speaker). At IST, he has held 7 courses (Física Hadrónica e Cromodinâmica Quântica (3 times), Física Nuclear (2 times), Mecânica Analítica, Mecânica Quântica) and he helped in the supervision of 2 PhD students. Elmar Biernat was a volunteer marker of the 49th International Physics Olympiad held in Lisbon, Portugal from 21–29 July 2018. As “Head of the month” he wrote an article on the website *teilchen.at* of the Austrian Physical Society (ÖPG) in August 2011.

Selected references:

Biernat, E. P., Gross, F., Peña, M. T., Stadler, A., Leitão, S. Quark mass function from a one-gluon-exchange-type interaction in Minkowski space. *Physical Review D* 98 (2018) 11, 114033. doi:10.1103/PhysRevD.98.114033.

Biernat, E. P., Gross, F., Peña, M. T., Stadler, A. Charge-conjugation symmetric complete impulse approximation for the pion electromagnetic form factor in the Covariant Spectator Theory. *Physical Review D* 92 (2015), 076011. doi:10.1103/PhysRevD.92.076011.

Biernat, E. P., Schweiger, W. Electromagnetic rho-meson form factors in point-form relativistic quantum mechanics. *Physical Review C* 89, 055205 (2014). doi:10.1103/PhysRevC.89.055205.



Filipe R. Joaquim

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Research area & interests:

Filipe R. Joaquim is interested in studying new physics phenomena at the elementary particle level. His research has been focused on the theoretical construction of new theories to be tested at current particle physics and cosmological experiments, which aim at understanding the origins of our Universe. He has published several papers in international journals and awarded the “Excellent teacher” distinction for the courses of Complements of Quantum Mechanics and Introduction to Research. Closer look at the possible CMS signal of a new gauge boson.

Selected references:

Aguilar-Saavedra, J., & Joaquim, F. (2014). Closer look at the possible CMS signal of a new gauge boson. *Physical Review D*, 90(11). doi:10.1103/physrevd.90.115010.

Branco, G., González Felipe, R., & Joaquim, F. (2012). Leptonic CP violation. *Reviews of Modern Physics*, 84. doi:10.1103/RevModPhys.84.515.

Joaquim, F. R., & Rossi, A. (2006). Gauge and Yukawa mediated supersymmetry breaking in the triplet seesaw scenario. *Physical Review Letters*, 97(18). doi:10.1103/physrevlett.97.181801.



Gernot Eichmann

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

PhD: University of Graz, 2009.

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Research area & interests:

Gernot Eichmann is an FCT Investigator who works in Quantum Chromodynamics and Hadron Physics, where he investigates bound states such as mesons, baryons, and multi-quark systems. In particular, he uses functional methods to develop a description of their spectra, structure properties and reaction mechanisms in terms of the elementary quarks and gluon degrees of freedom. He has published 28 papers in international journals and 21 conference proceedings, which have been cited over 1400 times on Inspire. He has co-supervised 3 master and 3 PhD theses.

Selected references:

Eichmann, G., Sanchis-Alepuz, H., Williams, R., Alkofer, R., Fischer, C. (2016). Baryons as relativistic three-quark bound states. *Prog. Part. Nucl. Phys.* 91 1–100. doi:10.1016/j.ppnp.2016.07.001

Eichmann, G. (2011). Nucleon electromagnetic form factors from the covariant Faddeev equation. *Phys. Rev. D* 84, 014014. doi:10.1103/PhysRevD.84.014014

Eichmann, G., Alkofer, R., Krassnigg, A., Nicmorus, D. (2010). Nucleon mass from a covariant three-quark Faddeev equation. *Physics Review Letters* 104, 201601 doi:10.1103/PhysRevLett.104.201601.



Gonçalo Figueira

Assistant Professor

Area: Plasma Physics, Lasers & Nuclear Fusion

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Research area & interests:

Gonçalo Figueira is interested in exploring and developing the concepts and the technology for next-generation high power lasers and their applications. In particular, he investigates new nonlinear optical materials and amplification techniques at the Laboratory for Intense Lasers, a leading facility hosting the most powerful laser in the country. He is in charge of the courses “Introduction to Experimental Physics” and “Optics and Lasers”. He has supervised 15 MSc and 4 PhD thesis. Apart from research and teaching, Gonçalo is also strongly involved with science communication and outreach activities, targeted at different audiences.

Gonçalo Figueira acted as chief editor of *Gazeta de Física*, the magazine of the Portuguese Physical Society, from 2013 to 2017. In 2016 he co-edited a book on the history of physics in Portugal in the 20th century. He became strongly involved with the commemorations of the international year of light, giving presentations and training sessions in optics and lasers at schools, workshops and science centres across the country.

Selected references:

Figueira, G., Alves, J., Dias, J. M., Fajardo, M., Gomes, N., Hariton, V., Imran, T., João, C. P., Koliyadu, J., Künzel, S., Lopes, N. C., Pires, H., Ruão F., and Williams, G. (2017). Ultrashort pulse capability at the L2I high intensity laser facility. *High Power Laser Science and Engineering*, 5. doi:10.1017/hpl.2017.2.

Pires, H., Galimberti, M., & Figueira, G. (2014). Numerical evaluation of ultrabroadband parametric amplification in YCOB. *Journal of the Optical Society of America B*, 31(11), 2608. doi:10.1364/josab.31.002608.

João, C. P., Pires, H., Cardoso, L., Imran, T., & Figueira, G. (2014). Dispersion compensation by two-stage stretching in a sub-400 fs, 12 mJ Yb:CaF₂ amplifier. *Optics Express*, 22(9), 10097. doi:10.1364/oe.22.010097.



Helena Alves

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Area: Condensed Matter & Nanotechnology

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Research area & interests:

Helena Alves develops materials with optoelectronic properties and nanotechnology process for advanced applications (flexible, transparent and wearable). In particular, she correlates solid-state materials structure and design with electronic, magnetic and mechanical properties, and device architecture for molecular and textile electronics applications. She has been responsible for creating and leading the molecular electronics line of research and collaborated with the course “Nanotechnology and Nanoelectronics”. She has 1 patent and 37 published papers in high quality international journals such as Nature Materials, Nature Communications, Journal of the American Chemical Society, Advanced Functional Materials, and is editor at Scientific Reports. She has given 95 presentations in international conferences (60 oral) and given 28 invited lectures in international conferences and universities abroad. She has supervised 7 MSc and 1 PhD thesis.

Helena Alves has participated in 2 outreach events, and 1 public session with debates about “Innovation sharing”. Helena Alves has given a radio interview.

Selected references:

Neves, A. I., Bointon, T. H., Melo, L. V., Russo, S., De Schrijver, I., Craciun, M. F., & Alves, H. (2015). Transparent conductive graphene textile fibers. *Scientific Reports*, 5(1). doi:10.1038/srep09866.

Alves, H., Pinto, R. M., & Maçôas, E. S. (2013). Photoconductive response in organic charge transfer interfaces with high quantum efficiency. *Nature Communications*, 4(1). doi:10.1038/ncomms2890.

Alves, H., Molinari, A., Xie, H., Morpurgo, A. F. (2008). Metallic conduction at charge-transfer interfaces. *Nature Materials*, 7, 574–580. doi:10.1038/nmat2205.



Horácio Fernandes

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Research area & interests:

Horácio Fernandes is a researcher at IPFN, where he coordinates the activity on the tokamak IST-TOK and is the Experimental Physics group leader. In 1999 he created the e-lab, the first remote laboratory at IST and one of the few in the world for education purposes, with free access and hosting about 20 online experiments. His scientific interests cover fusion devices diagnostics, real-time operation and engineering. He also maintains regular participation in science outreach. He was appointed during six years member of the “Technical Advisor Panel” at F4E (the European Agency for ITER), had been a research coordinator in IAEA and served in several national and international boards of conferences and societies. He has authored more than 200 scientific works either in international journals or conference proceedings. He has supervised 28 MSc and 5 PhD students.

Horácio Fernandes is the national coordinator of MEDEA programme from the Portuguese Physical Society (a national competition for the understanding of low frequency electromagnetic fields). To promote the use of e-lab (remote laboratories) in secondary schools he gave several workshops

and seminars, populate in some schools a few remote experiments and presently is promoting IoT for doing physics experiments. At a graduate level, he maintains an Athens course (athensprogramme.org) for foreigners every semester at IST. Horácio Fernandes chairs the PlasmaSurf (IPFN summer school) scientific committee.

Selected references:

Hidalgo, C., Silva, C., Pedrosa, M. A., Sánchez, E., Fernandes, H., & Varandas, C. A. (1999). Radial structure of reynolds stress in the plasma boundary of tokamak plasmas. *Physical Review Letters*, 83(11), 2203–2205. doi:10.1103/physrevlett.83.2203.

Cabral, J., Fernandes, H., Figueiredo, H., & Varandas, C. (1997). Operation of the tokamak IST-TOKK in a multicycle alternating flat-top plasma current regime. *Nuclear Fusion*, 37(11), 1575–1581. doi:10.1088/0029-5515/37/11/i07.

Neto, R., Fernandes, H., Pereira, J., & Duarte, A. (2012). E-lab remote laboratory integrated overview. *9th International Conference on Remote Engineering and Virtual Instrumentation (REV)*. doi:10.1109/rev.2012.6293102.



Ilídio Lopes

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Area: Astrophysics & Gravitation

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Research area & interests:

Ilídio Lopes works in astrophysics, cosmology and particle physics. In particular, his work focuses on stellar evolution, dark matter and neutrinos. Following his PhD in the University of Paris-Sorbonne (France), he was a postdoctoral fellow in the “Commissariat à l’énergie atomique et aux énergies alternatives” (France), a research associate in the Institute of Astronomy of the University of Cambridge (United Kingdom), and a fellow in the department of Physics of the University of Oxford (United Kingdom). He published more than 100 articles in high impact journals, with a small number of authors (one or two). He supervised four PhD students, two of which won PhD research awards from the Fundação Calouste Gulbenkian.

Ilídio Lopes has given several outreach seminars at High-Schools and in Public Sessions and has participated in several outreach events. He has also published several articles in newspapers and magazines. Moreover, several articles about his scientific work have appeared in scientific news magazines and websites like New Scientist and Institute Of Physics (IOP) news.

Selected references:

Saltas, I. D. and Lopes, I. Obtaining precision constraints on modified gravity with helioseismology. *Physical Review Letters*, 2019, 123 (9), id.091103 . doi:10.1103/PhysRevLett.123.091103.

Lopes, I., and Turck-Chièze, S. (2013) Solar neutrino physics oscillations: sensitivity to the electronic density in the sun’s core. *The Astrophysical Journal*, 2013, 765(1), 14. doi:10.1088/0004-637x/765/1/14.

Lopes, I. and Silk, J. (2010). Neutrino spectroscopy can probe the dark matter content in the sun. *Science* 330. 462. (Article chosen for Science Express Highlights, *Science*, Volume 329, pp.1251). doi:10.1126/science.1196564.



Ivo de Medeiros Varzielas

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

PhD: Oxford University, 2008.

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Research area & interests:

Ivo Varzielas has been working on beyond Standard Model extensions, including multi-Higgs doublet models, neutrino physics, and models with flavour symmetries to understand the origin of mass and the interface of particles with astrophysics and cosmology, including the nature of dark matter. He has over 60 papers, a total of over 2900 citations and h-index 30.

Selected references:

de Medeiros Varzielas, I., King, S. F., Zhou Y. L. (2020). Multiple modular symmetries as the origin of flavor. *Physical Review D* 101 no.5, 055033. arXiv:1906.02208 [hep-ph]. doi:10.1103/PhysRevD.101.055033.

de Medeiros Varzielas, I. and Hiller, G. (2015). Clues for flavor from rare lepton and quark decays. *JHEP* 1506 072. arXiv:1503.01084 [hep-ph]. doi:10.1007/JHEP06(2015)072.

de Medeiros Varzielas, I., King, S. F., Ross, G.G. (2007). Neutrino tri-bi-maximal mixing from a non-Abelian discrete family symmetry. *Physics Letters B* 648 201–206. hep-ph/0607045. doi:10.1016/j.physletb.2007.03.009.



Joana Gonçalves-Sá

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Research area & interests:

Joana Gonçalves-Sá works on data mining for decision-making. Has taught Introduction to Research and participated in the Energy Transfer classes. Is currently co-supervising one MSc student and has been on the jury of 7 MSc thesis defenses. Joana Gonçalves-Sá is the Director of the PGCD, Graduate Programme Science for Development, a PhD programme directed at Portuguese-speaking African students, based in Cabo Verde. Currently it has 55 enrolled students, working on their thesis in 10 different countries. Joana is the coordinator of the “Lab in a Box” project, a scientific kit with participation of Filipe Mendes (DF-IST), Pedro Brogueira (DF-IST), Catarina Júlio (IGC) and Mónica Bettencourt-Dias (IGC). The kit has been sponsored by the UNESCO, Instituto Camões and the Instituto Gulbenkian de Ciência.

Science Communication:

1) “La Nuit des Idées”, co-organized by the French Embassy/Institut Français and the Fundação Calouste Gulbenkian; 2) “Ciência, literacias e inclusão”, Invited Speaker, Centro de Formação de Escolas António Sérgio, Portugal; 3) “Decisões e Amostragem”, Invited Speaker, Ciclo Ponto de Gravidade, Teatro Cão Solteiro; 4) Arriaga M, and

Gonçalves-Sá, J. (17th January 2017). “Acordar para a democracia”, *Jornal Público*, National newspaper opinion column; 5) “Replacing the Ivory and Exiting the Tower”, *Encontros Ciência Aberta*, Ministério da Ciência, Tecnologia e Ensino Superior, Portugal; 6) “Digital Parliament – 40 years of Portuguese Parliamentary Debates”, Grupo de Trabalho para o Parlamento Digital, Portugal.

Selected references:

Muller, N., Piel, M., Calvez, V., Voituriez, R., Gonçalves-Sá, J., et al. (2016). A predictive model for yeast cell polarization in pheromone gradients. *PLOS Computational Biology*, 12(4), e1004795. doi:10.1371/journal.pcbi.1004795.

Won, M., Marques-Pita, M., Louro, C., & Gonçalves-Sá, J. (2017). Early and real-time detection of seasonal influenza onset. *PLOS Computational Biology*, 13(2), e1005330. doi:10.1371/journal.pcbi.1005330.

Wood, I. B., Varela, P. L., Bollen, J., Rocha, L. M., & Gonçalves-Sá, J. (2017). Human sexual cycles are driven by culture and match collective moods. *Scientific Reports*, 7(1). doi:10.1038/s41598-017-18262-5.



João L. M. Figueirinhas

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Research area & interests:

João Figueirinhas uses Nuclear Magnetic Resonance and Electro-Optical methods in the physical characterization of mesomorphic systems with potential technological application including liquid crystals, cellulose based composites and PDLCs. He has published 78 papers in international journals, 1 book and 5 book chapters and was awarded the “Excellent Teacher” distinction at IST in 2016. He has co-supervised 6 PhD and 2 Msc thesis.

João Figueirinhas published 2 articles in general magazines.

Selected references:

Cruz, C. R., Figueirinhas, J. L., Sebastião, P. J., & Pan Stanford Publishing. (2017). *NMR of liquid crystal dendrimers*. Singapore: Pan Stanford Publishing.

Echeverria, C., Almeida, P. L., Feio, G., Figueirinhas, J. L., Rey, A. D., & Godinho, M. H. (2015). Rheo-NMR study of water-based cellulose liquid crystal system at high shear rates. *Polymer*, 65, 18–25. doi:10.1016/j.polymer.2015.03.050.

Lehmann, M., Köhn, C., Figueirinhas, J., Feio, G., Cruz, C., & Dong, R. (2010). Biaxial nematic mesophases from shape-persistent mesogens with a fluorone bending unit. *Chemistry – A European Journal*, 16(28), 8275–8279. doi:10.1002/chem.201001214.



João Mendanha Dias

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Research area & interests:

João Mendanha Dias research is focused on secondary radiation sources and optical diagnostics in laser-plasma interaction field. I have also devoted significant work to optical applications in medicine (eye optical modeling) and in industry (spectroscopy and laser metrology). My research methodology is based on experimental work and occasionally simulations and modeling. He has supervised 8 MSc and 2 PhD thesis. At the Physics Dept. he has been responsible for several teaching experimental physics laboratories in the Engineering Physics and other IST's Engineering courses. Today he is the vice-presidente of the department for general affairs, spaces and budget.

João Mendanha Dias has been lecturer in several training courses in lasers for high school teachers and post-graduation courses in medicine. Scientific consultation for expositions and co-responsible for one module of the F. C. Gulbenkian exposition "À luz de Einstein 1905–2005". He is also member of the scientific council of the Interdisciplinary Portuguese Society of the medical laser since 1999.

Selected references:

Boné, A., Lemos, N., Figueira, G., & Dias, J. M. (2016). Quantitative shadowgraphy for laser-plasma interactions. *Journal of Physics D: Applied Physics*, 49(15), 155204. doi:10.1088/0022-3727/49/15/155204.

Ribeiro, F. J., Castanheira-Dinis, A., & Dias, J. M. (2012). Personalized Pseudophakic model for refractive assessment. *PLoS ONE*, 7(10), e46780. doi:10.1371/journal.pone.0046780.

Cipiccia, S., Islam, M. R., Ersfeld, B., Shanks, R. P., Brunetti, E., Vieux, G., Yang, X., Issac, R. C., Wiggins, S. M., Welsh, G.H., Anania, M.-P., Maneuski, D., Montgomery, R., Smith, G., Hoek, M., Hamilton, D. J., Lemos, N. R. C., Symes, D., Rajeev, P. P., Shea, V. O., Dias, J. M., Jaroszynski, D. A., (2011). Gamma-rays from harmonically resonant betatron oscillations in a plasma wake. *Nature Physics*, 7(11), 867–871. doi:10.1038/nphys2090.



João P. S. Bizarro

Associate Professor with "Agregação"

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Research area & interests:

João P. S. Bizarro was born in Dili, Timor (formerly a Portuguese territory), in 1963. He received the Technological Physics Engineering degree from Instituto Superior Técnico, Lisboa, Portugal, in 1987, the PhD degree in Radiation and Plasmas from Université de Provence (Aix-Marseille I), Marseille, France, in 1993, and the Habilitation in Physics from IST in 2010. He was an JNICT fellow between 1988 and 1990, was an Euratom fellow between 1990 and 1993 and has been a professor in the Physics Department, IST, since 1993, having been the Head of the Theory and Modeling Group of the Associação Euratom-IST during 2008–2012. He has visited and worked in fusion laboratories such as the Joint European Torus, Abingdon, UK, TORE SUPRA, Cadarache, France, and the Instituto de Física, Universidade de São Paulo, Brazil, having been a research fellow of the Junta Nacional de Investigação Científica e Tecnológica, Lisboa, Portugal, in 1988–1990, and of the Commission of the European Communities (Euratom) in 1990–1993. He has been appointed to bodies of the European Fusion Programme, having seated in the Fusion Physics Committee during 2000–2002, and in the Scientific and Technological Advisory Committee during 2002–2007. He has authored, or co-authored, more than 90 papers in leading scientific journals and his research interests have ranged

from quantum mechanics and thermodynamics to RF engineering and signal processing, and have included as well several fields of high-temperature plasma physics such as plasma waves, kinetic equations, RF heating and current drive, and plasma equilibrium and transport. He has supervised, or co-supervised, 1 MSc and 5 PhD thesis, as well as 4 Post-docs, won an Honourable Mention in Physics of the 2012 UTL/Santander-Totta scientific prize, was awarded Outstanding Reviewer Status by Elsevier (*Annals of Physics*) in 2014, and several Peer Review Awards by Publons in 2017.

Selected references:

Bizarro, J. P. (2017). Comment on "Not all counterclockwise thermodynamic cycles are refrigerators" [*Am. J. Phys.* 84, 413–418 (2016)]. *American Journal of Physics*, 85(11), 861–863. doi:10.1119/1.5005928.

Mendonça, J. T., & Bizarro, J. P. (2017). Twisted waves in a magnetized plasma. *Plasma Physics and Controlled Fusion*, 59(5), 054003. doi:10.1088/1361-6587/aa6231.

Vilela Mendes, R., & Bizarro, J. P. (2017). Analytical study of growth estimates, control of fluctuations, and conservative structures in a two-field model of the scrape-off layer. *Physics of Plasmas*, 24(1), 012303. doi:10.1063/1.4973222.



João P. Silva

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Area: Particle Physics & Nuclear Physics

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Research area & interests:

João P. Silva is interested in models and signals of new physics, including neutrinos, CP violation, and especially signs of more than one Higgs at LHC. He received the IST Outstanding Teaching Award, chosen from amongst all 1st cycle lecturers in 2014/2015, which recognizes and promotes excellence in education.

Occasional seminars at the CERN Masterclasses organized by P. Abreu.

Selected references:

Branco, G., Ferreira, P., Lavoura, L., Rebelo, M., Sher, M., & Silva, J. P. (2012). Theory and phenomenology of two-Higgs-doublet models. *Physics Reports*, 516(1–2), 1–102. doi:10.1016/j.physrep.2012.02.002.

Botella, F. J., & Silva, J. P. (1995). Jarlskog-like invariants for theories with scalars and fermions. *Physical Review D*, 51(7), 3870–3875. doi:10.1103/physrevd.51.3870.

Ferreira, P. M., Santos, R., Sher, M., & Silva, J. P. (2012). Implications of the LHC two-photon signal for two-Higgs-doublet models. *Physical Review D*, 85(7). doi:10.1103/physrevd.85.077703.



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Research area & interests:

Member of the CMS Collaboration.

Seminars in High schools and public sessions.

Selected references:

R. Arnaldi et al./NA60 Collaboration. (2006). First measurement of the ρ spectral function in high-energy nuclear collisions. *Physical Review Letters* 96, 162302. doi:10.1103/PhysRevLett.96.162302.

Faccioli, P., Lourenço, C., Seixas, J., & Wöhri, H. K. (2010). Towards the experimental clarification of quarkonium polarization. *The European Physical Journal C*, 69(3–4), 657–673. doi:10.1140/epjc/s10052-010-1420-5.

Chatrchyan, S. et al./The CMS Collaboration. (2013). Measurement of the prompt J/ψ and $\psi(2S)$ polarizations in pp collisions at $\sqrt{s} = 7$ TeV. *Physics Letters B*, 727 381–402. doi:10.1016/j.physletb.2013.10.055.



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Research area & interests:

Jorge C. Romão studies weak interactions. This includes looking at precision tests of the Standard Model as well as studying its extensions. He is a specialist in supersymmetric theories both with and without R-parity, where he has done extensive work in connection with neutrino physics. More recently his interests have moved the focus into models with several Higgs doublets, both CP conserving or CP violating. He has published 94 papers in top international journals and two books. He has been the Portuguese coordinator for 4 European Union Marie Curie Training Networks. He has supervised or co-supervised 8 PhD thesis.

Jorge C. Romão has given 2 outreach seminars and participated in the CERN Master Classes.

Selected references:

Hirsch, M., Díaz, M. A., Porod, W., Romão, J. C. & Valle, J. W. (2000). Neutrino masses and mixings from supersymmetry with bilinear R-parity violation: A theory for solar and atmospheric neutrino oscillations. *Physical Review D*, 62(11). doi:10.1103/physrevd.65.119901.

Fontes, D., Romão, J. C., Santos, R., & Silva, J. P. (2015). Large pseudoscalar Yukawa couplings in the complex 2HDM. *Journal of High Energy Physics*, 2015(6). doi:10.1007/jhep06(2015)060.

Valle, J. W. F., & Romão, J. C. (2015). Neutrinos in high energy and astroparticle physics. Wiley-VCH. ISBN: 978-3-527-41197-9.



Jorge Vieira

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Area: Plasma Physics, Lasers & Nuclear Fusion

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Research area & interests:

Jorge Vieira investigates advanced plasma accelerator based accelerators and light sources using theory and computer simulations. He was the responsible for the course Plasma Physics and Technology and Advanced Plasma Physics. Jorge Vieira has published 80 papers in international journals. He supervised 2 MSc thesis and co-supervised 1 PhD thesis.

Jorge Vieira was interviewed by national newspaper Público on the first experimental results of the Advanced Wakefield Experiment (AWAKE) at CERN (<https://www.publico.pt/2018/09/04/ciencia/noticia/puseram-electroes-a-surfur-uma-onda-de-plasma-e-cles-aceleraramse-1842420>).

Selected references:

Adli, E. et al, Acceleration of electrons in the plasma wakefield of a proton bunch, *Nature*, 2018, 561, 363–367, doi:10.1038/s41586-018-0485-4

Vieira, J., Mendonça, J. T., Quéré, F. Optical control of the topology of laser-plasma accelerators, *Physical Review Letters*, 2018 121, 054801, doi:10.1103/PhysRevLett.121.054801

Vieira, J., Trines, R. M., Alves, E. P., Fonseca, R. A., Mendonça, J. T., Bingham, R., Norreys, P., Silva, L. O. (2016). Amplification and generation of ultra-intense twisted laser pulses via stimulated Raman scattering. *Nature Communications*, 7, 10371. doi:10.1038/ncomms10371.



José Guilherme Milhano

Associate Professor

Area: Particle Physics & Nuclear Physics

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Research area & interests:

Guilherme Milhano is a QCD phenomenologist whose main current focus is understanding the properties of the Quark Gluon Plasma produced in ultra-relativistic ion collisions. He has made significant contributions to the advancement of jet studies in heavy ion collisions and the understanding of the initial conditions for such collisions. He has been deeply involved in exploring the physics potential of future colliders. He currently leads the Phenomenology Group at LIP. He has been responsible for various courses at the Physics Department, most recently for 'Oscillations and Waves', 'Quantum Mechanics II' and 'Advanced Quantum Mechanics'.

Guilherme Milhano has given several outreach talks to high school students.

Selected references:

Brewer, J., Milhano, J. G., and J. Thaler, J. (2019). Sorting out quenched jets. *Physics Review Letters* 122 (2019) no.22, 222301. doi:10.1103/PhysRevLett.122.222301.

L. Apolinário, Milhano, J. G., Salam, G. P., and Salgado, C. A. (2018). Probing the time structure of the quark-gluon plasma with top quarks. *Physics Review Letters* 120 (2018) no.23, 232301. doi:10.1103/PhysRevLett.120.232301.

Casalderrey-Solana, J., Gulhan, D., Milhano, G., Pablo, D., and Rajagopal, K. (2017). Angular Structure of jet quenching within a hybrid strong/weak coupling model. *HEP03* (2017), 135. doi:10.1007/JHEP03(2017)135.



José Luís Martins

Full Professor

Area: Condensed Matter & Nanotechnology

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Research area & interests:

Research on electronic structure of solids. development of methods. Applications to semiconductors and nanostructures.

Selected references:

Troullier, N., and Martins, J. L. (1993). Efficient pseudopotentials for plane-wave calculations. *Physical Review B*, 43(3), 1993–2006. doi:10.1103/phyrevb.43.1993.



José Pizarro de Sande e Lemos

Full Professor

Area: Astrophysics & Gravitation
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Research area & interests:

José P. S. Lemos works on black holes and fundamental physics. He devises methods to calculate the black hole entropy and so to arrive at an understanding of what and where are the black hole degrees of freedom. Those are connected at a semi-classical level to a still elusive quantum gravity. He also works on astrophysical and cosmological problems. He has published more than 150 papers, has more than 5000 citations in Inspires, has supervised 9 PhD theses, 15 MSc theses, and 10 postdoctoral researchers. He is *Professor Catedrático* at the Physics Department of Instituto Superior Técnico, President of CENTRA (Centro Multidisciplinar de Astrofísica) and in the period 2013–2015 has been President of the Physics Department. He is the recipient of national and international prizes, and has been invited professor at the University of Paris, University of Columbia New York, Freie University of Berlin, Universities and Institutions in Rio de Janeiro and in São Paulo. He has lectured and has been invited to give main talks in several international schools and conferences.

José P. S. Lemos has organized the past IST Schools in Astrophysics and Gravitation, in particular the 8th School held in 2016, and the 9th to be held in 2018.

He has been interviewed in Radio Antena 2 Programa Ciência on black holes, gravitational waves, and cosmology, several times. He has delivered many seminars in Public Sessions.

Selected references:

Rosa, J. L., Carloni, S., Lemos, J. P., & Lobo, F. S. (2017). Cosmological solutions in generalized hybrid metric-Palatini gravity. *Physical Review D*, 95(12). doi:10.1103/physrevd.95.124035. arXiv: 1703.03335 [gr-qc].

Lemos, J. P., & Zanchin, V. T. (2017). Plethora of relativistic charged spheres: The full spectrum of Guifoye's static, electrically charged spherical solutions. *Physical Review D*, 95(10). doi:10.1103/physrevd.95.104040.

Lemos, J. P., Minamitsuji, M., & Zaslavskii, O. B. (2017). Unified approach to the entropy of an extremal rotating BTZ black hole: Thin shells and horizon limits. *Physical Review D*, 96(8). doi:10.1103/physrevd.96.084068. arXiv: 17 09.08637 [hep-th].



Liliana Apolinário

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Research area & interests:

Liliana Apolinário contributes to the development of the theory of the strong interactions (QCD) at high temperature and density. Her work is particularly focused on the characterisation of the Quark Gluon Plasma that is created in ultra-relativistic heavy-ion collisions by using jets (the result of a QCD parton shower). She has made significant contributions to the field so far by (1) theoretical development of the QGP induced modifications to the QCD parton shower (jet quenching) and (2) novel proposals of jet observables able to accurately measure the QGP properties. This has been accomplished by 27 publications and more than 35 presentations in international conferences (15 of which as an invited speaker). At the department, she has been lecturing for the last 4 years (Analytical Mechanics; Hadron Physics and Quantum Chromodynamics; Oscillations and Waves) and this year took full responsibility of the Techniques of Mathematical Physics. She was awarded “Excellent Teacher” distinction at IST in 2016, 2017 and 2019. She has already supervised 4 MSc students (1 is on-going) and 9 Summer Internship students.

Participated in several outreach events: NFIST activities (2004–2005); Master Classes (since 2015); Physics Olympiad (2015). Invited to give 4 lectures in MsC and PhD. schools (2017–2020) and 3 outreach talks (2019–2020). Has organised the Symposium Data Science in (Astro)Particle Physics and Cosmology: the bridge to Industry (School and Symposium) in 2019 and 2020. She has been interviewed in Radio Antena 1 Programa 90 segundos de Ciência.

Selected references:

Apolinário, L., Milhano, J. G., Salam, G. P., and Salgado C. A. Probing the time structure of the quark-gluon plasma with top quarks, Under revision at *PRL*.

Zhang, X., Apolinário, L., Milhano, J., & Płoskoń, M. (2016). Sub-jet structure as a discriminating quenching probe. *Nuclear Physics A*, 956, 597–600. doi:10.1016/j.nuclphysa.2016.02.028.

A. Dainese et al. (2017). Heavy ions at the Future Circular Collider. *CERN Yellow Report* no.3, 635–692. doi:10.23731/CYRM-2017-003.635.



Luís Filipe Mendes

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Area: Interdisciplinary physics

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Research area & interests:

Luís Filipe Mendes worked on the scientific field of solar cooling (solar assisted absorption chillers) and, more recently, on concentrating solar energy. In the period 2018–2019, in the field of solar energy, he was Senior Lecturer of two courses on solar energy at IST (Solar Thermal Energy and Photovoltaic Solar Energy), he supervised 6 MSc thesis (concluded) and 2 PhD thesis (in progress). He is co-author of papers presented in the last two Solar PACES International Conferences, published by the AIP. He was awarded the “Excellent Teacher” distinction at IST in 2018 and 2019.

Luís Filipe Mendes has a particular interest in teaching physics from an experimental point of view and sparking curiosity for science in people of all ages. In 2018–2019 he was involved in the project “Lab in a Box” designing experiments and support protocols for high school students in Cabo Verde.

Selected references:

Apolinário, L., Milhano, J., Salam, G. P., and Salgado, C. A. (2018). Probing the time structure of the quark-gluon plasma with top quarks. *Physical Review Letters* 120, 23, 232301 doi:10.1103/PhysRevLett.120.232301.

Apolinário, L., Milhano, J., Ploskon, M., Zhang, X. (2018). Novel subject observables for jet quenching in heavy-ion collisions. *European Physical Journal C* 78, 6, 529. doi:10.1140/epjc/s10052-018-5999-2.

Abada, A. et al. (2019). FCC physics opportunities: Future circular collider. Conceptual design report volume 1, *European Physical Journal C* 79, 6, 474. doi:10.1140/epjc/s10052-019-6904-3.



Luís L. Alves

Full Professor

Area: Plasma Physics, Lasers & Nuclear Fusion

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Research area & interests:

Luís L. Alves is the coordinator of the Scientific Domain of Plasma Physics, Lasers and Nuclear Fusion of the Department of Physics of IST and a former Head of this department. He is the Coordinator of Doctoral Programmes in Physics and Engineering Physics of IST. He is the Head of group N-Plasmas Reactive: Modelling and Engineering (N-PRiME) with Instituto de Plasmas e Fusão Nuclear, where he also serves as Vice-President for Scientific Affairs. He works in the modelling and simulation of low-temperature plasmas. His research focuses on the study of microwave and radio-frequency discharges, and the development of kinetic models of interest for material science, biological and environmental applications. He was the PI developing the LisbOn KInetics (LoKI) simulation tool (<https://nprime.tecnico.ulisboa.pt/loki/>). He has co-authored over 250 technical publications, including over 90 journal papers, delivered over 35 invited lectures, and have 3 patents registered. He supervises(d) 22 PhD and MSc theses.

Luís L. Alves has been the chairman/cochairman of various international conferences and schools. He is a regular teacher of the summer school “Plasmasurf” (July of every year) and the ATHENS school in Plasma Science and Technology (March

of every year), organized by IPFN/IST. He has been a regular collaborator of the MEFT/DF joint initiative “MEFT: Desafiar os limites”, targeting the recruitment of high-school students for MEFT. He leads the outreach efforts (including the website) of N-PRiME.

Selected References:

Guerra, V., Tejero-del-Caz, A., Pintassilgo, C. D., Alves, L. L. (2019). Modelling N₂-O₂ plasmas: volume and surface kinetics. *Plasma Sources Sci. and Technol.* 28 073001. doi:10.1088/1361-6595/ab252c.

Tejero-del-Caz, A., Guerra, V., Gonçalves, D., Lino da Silva, M., Marques, L., Pinhão, N., Pintassilgo, C. D., Alves, L. L. (2019). The LisbOn KInetics Boltzmann solver. *Plasma Sources Sci. and Technol.* 28 04300. doi:10.1088/1361-6595/ab0537.

Guerra, V., Silva, T., Ogloblina, P., Grofulović, M., Terraz, L., Silva, M. L., Pintassilgo, C. D., Alves, L. L. and Guaitella, O. (2017). The case for in situ resource utilisation for oxygen production on Mars by non-equilibrium plasmas. *Plasma Sources Science and Technology*, 26(11), 11LT01. doi:10.1088/1361-6595/aa8dcc.



Luis O. Silva

Full Professor

Area: Plasma Physics, Lasers & Nuclear Fusion

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Research area & interests:

Luis O. Silva research activities are focused in the *in silico* exploration of the interaction of intense beams of particles and e.m. fields with plasmas, in laboratory and astrophysical scenarios, combining theoretical physics with massively parallel numerical simulations. He has published more than 200 publications, supervised 16 PhD theses and mentored 8 post-doctoral fellows. He is Grande Oficial da Instrução Pública (2016), has been awarded with two ERC Advanced grants and he is a fellow of the APS (2009), the EPS (2017), the European Academy of Sciences (2019), and Corresponding Member of the Lisbon Academy of Sciences (2019).

Luis O. Silva regularly gives presentations in high-schools (approx. 5 per year) and hosts internships in his group of high school students. His group is also responsible for several installations in art/science fairs (approx. 5 per year), based on the GoLP VR Lab and scientific visualisations. He contributes to journal *i* (approx. 4 articles per year). He is the *ex officio* president of the Fundação Edgar Cardoso and President of the General Assembly of the Portuguese Physics Society.

Selected references:

Silva, L. O., Marti, M., Davies, J. R., Fonseca, R. A., Ren, C., Tsung, F. S., & Mori, W. B. (2004). Proton shock acceleration in laser-plasma interactions. *Physical Review Letters*, 92(1). doi:10.1103/physrevlett.92.015002.

Martins, S. F., Fonseca, R. A., Lu, W., Mori, W. B. & Silva, L. O. Exploring laser-wakefield-accelerator regimes for near-term lasers using particle-in-cell simulation in Lorentz-boosted frames, *Nature Physics*, 2010 volume 6, pages 311–316.

Schoeffler, K. M., Grismayer, T., Uzdensky, D., Fonseca, R. A., Silva, L. O., Bright gamma-ray flares powered by magnetic reconnection in QED-strength magnetic fields, *The Astrophysical Journal* (2019), 870, 49.



Luis V. Melo

Assistant Professor with “Agregação”

Area: Condensed Matter & Nanotechnology

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Research area & interests:

L. V. Melo’s research has been focused on nanotechnology topics since 1989: Giant Magneto Resistive (GMR) materials and sensors, Scanning Probe Microscopy (SPM), both from the side of multidisciplinary imaging (biology, nanomaterials) and from the technology development. Lately he has also been interested in synchronization problems and acoustic detection using micro-cantilevers. He was Managing Vice-President of IST-ID, a non-profit institution managing the RD activity of IST (2019 budget 20.5 M€), 2016–2020. Advisor to the President of FCT (Portuguese Research Council) from 2006–2010. Benjamin Meaker Visiting Professor (2010–2011) at the University of Bristol (UK). Benjamin Meaker Visiting Professor (2010–2011), University of Bristol (UK). Co-coordinator of the Portuguese Industry and Manufacture Strategic Agenda. Delegate or Expert in various EU boards (NMBP – Nanoscience, Nanotechnology, Materials and new Production Technologies - Program Committee, High Level Group on Materials, ECSEL JTI Governing and Public Authorities Boards). Delegate to the OECD WPN and Bureau Member (2007–2014). Delegate to the OECD WP BNCT (2017–) and Bureau Member (2019–).

Besides international policy fora, L.V. Melo participated in different outreach activities: he was

in the team organizing the exhibition “À Luz de Einstein” (commissioners C. Matos Ferreira and A. Eiró) Einstein’s “miraculous year” at the Fundação Gulbenkian in 2005 (~60k visitors). In 2010 a discussion on the dematerialization of music, with a musicologist from U. Nova at FNAC, by invitation of Ciência Viva. In the framework of PortugalNano coordination at FCT he participated in many policy or outreach activities, including CEMES (Toulouse, 2008), NanoSwec (Bordeaux, 2008), the Workshop PT-BR on Nanotechnologies (Rio de Janeiro, 2010), or the NanoIberian Conference (Braga, 2008).

Selected references:

Oliveira, H. M., & Melo, L. V. (2015). Huygens synchronization of two clocks. *Scientific Reports*, 5(1). doi:10.1038/srep11548.

Gonçalves, J., Carmona, B., Nolasco, S., Melo, L. V., Soares, H. (2019) Cilia distal domain: diversity in evolutionarily conserved structures. *Cells*, 8(2), 160: 2019. doi:10.3390/cells8020160.

Neves, A. I. S., Rodrigues, D. P., De Sanctis, A., Torres Alonso, E., Pereira, M. S., Amaral, V. S., Melo, L. V., Russo, S., de Schrijver, I., Alves, H., Craciun, M. F. Towards conductive textiles: coating polymeric fibres with graphene. *Scientific Reports* 7: 4250 (2017). doi:10.1038/s41598-017-04453-7



Manuela Mendes

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Research area & interests:

My main research interests is seismic imaging applied to oil industry, environment and culture heritage. Elastic Ray-Born L2- Migration/Inversion.

Selected references:

Beydoun, W. B., & Mendes, M. (1989). Elastic Ray-born L2-migration/inversion. *Geophysical Journal International*, 97(1), 151–160. doi:10.1111/j.1365-246x.1989.tb00490.x.

Mendes, M. (2009). A hybrid fast algorithm for first arrivals tomography. *Geophysical Prospecting*, 57(5), 803–809. doi:10.1111/j.1365-2478.2008.00755.x.

Martinho, E. & Dionísio, A., and Mendes, M. (2017). Simulation of a portuguese limestone masonry structure submitted to fire: 3D ultrasonic tomography approach. *International Journal of Conservation Science*, 8, 565–580.



Maria Margarida Nesbitt

Rebelo da Silva

Invited Associate Professor

Area: Particle Physics & Nuclear Physics

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Research areas & interests:

Most of my work has been done in various phenomenological aspects of unified electroweak interactions, with particular emphasis on CP violation, Flavour Physics and Higgs Physics. I am specially interested in models with an extended scalar sector and the implications for Flavour Physics. I am also very interested in the question of the origin of fermion masses and mixing, both in the quark and leptonic sectors, in the framework of the Standard Model and beyond the SM as well as in the origin of CP violation. My work is closely related to LHC physics. More than 40 papers in journals with referee. More than 3300 citations in Inspire, h index = 29.

Selected references:

Branco, G., Ferreira, P., Lavoura, L., Rebelo, M., Sher, M., & Silva, J. P. (2012). Theory and phenomenology of two-Higgs-doublet models. *Physics Reports*, 516(1–2), 1–102. (790 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1016/j.physrep.2012.02.002 .

Rebelo, M. N. (2003). Leptogenesis without CP violation at low energies. *Physical Review D*, 67(1). (68 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1103/physrevd.67.013008.

G. C. Branco, M. N. Rebelo and J. I. Silva-Marcos. (1999). Degenerate and quasidegenerate majorana neutrinos. *Physical Review Letters*, 82(4), 683–686. (103 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1103/physrevlett.82.683.



Mário J. Pinheiro

Assistant Professor with “Agregação”

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Selected references:

Pinheiro, M.J. (2017). A reformulation of mechanics and electrodynamics. *Helvion*, 3(7), e00365. doi:10.1016/j.helivon.2017.e00365.

Pinheiro, M. J. (2013). A variational method in out-of-equilibrium physical systems. *Scientific Reports*, 3(1). doi:10.1038/srep03454.

Pinheiro, M. J. (2016). Some effects of topological torsion currents on spacecraft dynamics and the flyby anomaly. *Monthly Notices of the Royal Astronomical Society*, 461(4), 3948–3953. doi:10.1093/mnras/stw1581

Mário maintains the scientific blog Science2be: <https://science2be.wordpress.com/>



Mário Lino da Silva

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Research areas & interests:

Mário Lino da Silva has an Aerospace Eng. degree from IST (2001) and a PhD in Plasma Physics from the Université d’Orléans, France (2004). Since 2001 he has worked on the topic of nonequilibrium kinetic and radiative processes in low-pressure, high-speed hydrodynamic plasmas, with the application to spacecraft reentry flows. He has been participating in several technology research programs funded by the European Space Agency, and is the Manager of the IPFN Hypersonic Plasmas Laboratory, which hosts the largest Space research facility in Portugal, the European Shock-Tube for High Enthalpy Research (ESTHER).

Mário Lino da Silva has given about 80 outreach seminars on Space and Space exploration at High-Schools in the scope of the ESERO program “Space goes to School”. Mário Lino da Silva has also published 22 articles in newspapers and magazines, and participated in 6 interviews in national radio and television.

Selected references:

Vargas, J., Lopez, B., and Lino da Silva, M. (2020). Heavy-impact vibrational excitation and dissociation processes in CO₂. Preprint arXiv:2006.10426.

Vargas, J., Lopez, B., and Lino da Silva, M. (2020). CDSdv: A compact database for the modeling of high-temperature CO₂ radiation. *Journal of Quantitative Spectroscopy and Radiative Transfer* 245: 106848. doi:10.1016/j.jqsrt.2020.106848.

Santos Fernandes, L., Lopez, B., and Lino da Silva, M. (2019). Computational fluid radiative dynamics of the Galileo Jupiter entry. *Physics of Fluids* 31, no. 10: 106104. doi:10.1063/1.5115264.



Mário Pimenta

Full Professor

Area: Particle Physics & Nuclear Physics

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Research areas & interests:

Particle and Astroparticle Physics, in particular with Ultra High Energy Cosmic Rays and very High Energy Gamma Rays. Experimental High Energy Physics. Searches for New Physics. Hadronic Interactions. Radiation environment in the Heliosphere. Radiation effects on electronic components. Radiation monitors for space missions. Photosensors. Since 1989 Principal Investigator of more than 30 projects of relevant national interest financed by the Portuguese Science funding agencies in the framework of Portuguese participation at CERN and at ESA and in cosmic rays experiments. Supervisor of twelve PhD theses and several master theses. He co-authored the books “Introdução à Física”, and “Introduction to Particle and Astroparticle Physics”, authored and co-authored more than 400 scientific articles.

President of LIP since 2015 (and Director since 1995), organized and gave a LIP overview seminar in the 30th anniversary of LIP and in several occasions, presented 5 outreach seminars at IST or in public sessions in Montijo and in the Lisbon Planetarium, and organized advanced training schools. He is also the coordinator of the IDPASC Doctorate

Newtork (International Doctorate in Particle and astroparticle physics, Astrophysics and Cosmology) and of the national FCT IDPASC Portugal doctorate programme.

Selected references:

De Angelis, A., and Pimenta, M. J. (2015). *Introduction to particle and astroparticle physics: Questions to the universe*. Milan: Springer. ISBN: 978-88-470-2687-2 (Print) 978-88-470-2688-9 (Online).

Dias de Deus, J., Pimenta, M., Noronha, A., Penha, T., Brogueira, P. (2014). *Introdução à Física*. Physics textbook for undergraduates (1st Edition, McGrawHill, 1992; 2nd Edition, McGrawHill, 2000; 3rd Edition, Escolar Editora, 2014. Spanish edition, McGrawHill, 2001). ISBN 9789725924402.

Alexander Aab et al. (includes M. Pimenta), Pierre Auger Collaboration. (2016). Testing hadronic interactions at ultrahigh energies with air showers measured by the Pierre Auger Observatory. *Physical Review Letters* 117, 19, 192001. doi:10.1103/PhysRevLett.117.192001.



Marta Fajardo

Assistant Professor

Area: Plasma Physics, Lasers & Nuclear Fusion

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Research areas & interests:

Marta Fajardo studies plasmas in extreme conditions, in particular Warm Dense Matter, to understand the transition between solid and classical plasma state. She is the leader of the VOXEL laboratory, where high intensity XUV and X-ray sources are used to develop novel dense plasma diagnostics and imaging systems. These X-ray diagnostics have applications beyond plasma physics, in biological imaging and material science. She has published 104 articles in international journals including Nature, Nature Physics, Nature Photonics, Physical Review Letters, etc, and was awarded the “Exellent Teacher” distinction at IST in 2017 and 2019. She supervised 6 PhD thesis and 6 Masters students. She was elected chair of Beam Plasma and Inertial Fusion section of European Physical Society – Division of Plasma Physics in 2015, for which she is now honorary member.

Marta Fajardo is a member of the Gender Balance group at IST. She has organized 5 international graduate research courses and part of the local organizing committee of 12 international conferences and workshops. She has been a speaker for “Encon-

tro com o Cientista” at Escola Ciência Viva. She hosted the Nobel Physics prize recipient Gérard Mourou for a Distinguished Lecture at IST and at Pavilhão Ciência Viva.

Selected references:

Williams, G. O., Künzel, S., Daboussi, S., Iwan, B., Gonzalez, A. I., Boutu, W., ... Fajardo, M. (2018). Tracking the ultrafast XUV optical properties of x-ray free-electron-laser heated matter with high-order harmonics. *Physical Review A*, 97(2). doi:10.1103/physreva.97.023414.

Lambert, G., Vodungbo, B., Gautier, J., Mahieu, B., Malka, V., Sebban, S., ... Fajardo, M. (2015). Towards enabling femtosecond helicity-dependent spectroscopy with high-harmonic sources. *Nature Communications*, 6(1). doi:10.1038/ncomms7167.

Duarte, J., Cassin, R., Huijts, J., Iwan, B., Fortuna, F., Delbecq, L., Chapman, H., Fajardo, M., Kovacev, M., Boutu, W., and Merdji, H. (2019). Computed stereo lensless X-ray imaging. *Nature Photonics* 13 (7), 449–453 (2019).



Michele Gallinaro

Invited Assistant Professor

Area: Particle Physics & Nuclear Physics

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Research areas & interests:

I currently hold a research position at LIP, where I have been conducting research in the context of the Portuguese participation in the CMS experiment at the Large Hadron Collider (LHC) at CERN. I have been involved in the study of Standard Model (SM) and Beyond SM processes to fully exploit the opportunities of the unparalleled energy of the LHC collisions. Besides my research activity at LIP, I have been providing support to the academic activities at IST in three main areas: 1) Submitted research proposals to be conducted by students, both for Master and Doctorate level. In this domain, during the past few years I have been supervising several students, providing guidance and training. 2) Provided support for the basic Physics courses at the University; 3) I am responsible coordinator for the advanced course on “Physics at the LHC” (yearly, since 2012), a specialized course in the field of High Energy Particle Physics. This course is aimed at teaching the basic concepts on the fundamental research that is being pursued at the LHC.

I am occasionally invited to give seminars in Public Sessions related to my research activity at CERN/LHC. Also, I regularly participate to Outreach activities and dedicated Schools aimed at undergraduate students.

Selected references:

Khachatryan, V. et al./CMS Collaboration. (2015). Search for a charged Higgs boson in proton–proton collisions at 8 TeV. *Journal of High Energy Physics* 1511, 018. doi:10.1007/JHEP11(2015)018.

Chatrchyan, S. et al./CMS Collaboration. (2012). Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC. *Physics Letters B* 716 30. doi:10.1016/j.physletb.2012.08.021.

Abe, F. et al./CDF Collaboration. (1995). Observation of top quark production in proton-antiproton collisions. *Physics Review Letters* 74 2626.



Nuno Leonardo

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Research areas & interests:

Nuno Leonardo explores novel phenomena with CERN’s Large Hadron Collider. The unprecedented energy and intensity frontiers attained with the LHC gives access to extremely rare processes, which offer in turn exquisite sensitivity for revealing and characterising new physics (NP) beyond the current standard model (SM) of particle physics. Detecting such tiny NP signals buried in the much more abundant SM backgrounds is achieved through state-of-the-art data filtering and analysis techniques and machine learning. He is involved in the exploration of such rare processes in both proton and heavy nuclei collision data. He is principal researcher at LIP. Previously he held researcher positions at MIT, CERN, Purdue University, and studied at IST (Lic.), Cambridge (MSc) and MIT (PhD). At CMS he has served in the Trigger and Physics coordinations of the experiment, and at LIP he is coordinator for advanced training and coPI of the CMS group.

Nuno Leonardo has led several discoveries in particle physics. He co-authors more than 1150 papers. He has given more than 25 invited colloquia and seminars at top research institutions (Americas, Europe, Asia), and more contributions at international

conferences, including a conference summary/concluding talk. He has established and coordinates the LIP Internship Program, that receives ca. 60 university students each Summer. Students obtain hands-on training in particle physics, data analysis techniques, instrumentation, presentation of results and paper writing — and in many cases their first active contact with frontier research. He participates regularly in science outreach activities.

Selected references:

CMS and LHCb Colls. (2015). *Observation of the rare Bs to $\mu+\mu-$ decay from the combined analysis of CMS and LHCb data.* *Nature* 522 68. doi:10.1038/nature14474 Nature 522 (2015) 68.

CMS Coll. (2012). Observation of sequential Υ suppression in PbPb collisions. *Physics Review Letters* 109 (2012) 222301. doi:10.1103/PhysRevLett.109.222301.

Leonardo, N. (2011). *Matter antimatter fluctuations — Search, discovery and analysis of Bs flavor oscillations.* ISBN 978-3-8433-7693-8.



Patricia Conde Muíño

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Research areas & interests:

Patricia Conde Muíño is the coordinator of the Portuguese team participating in the ATLAS experiment at CERN. She contributed to the discovery of the Higgs boson, in the WW decay channel, to the first observation of the Higgs decays to WW pairs, to b quark pairs and also to the first observation of associated production with W and Z bosons at ATLAS. She is currently probing the spin and CP properties of the hWW vertex in the associated production channel of a Higgs and a W boson. On the technical side, she has wide experience on real time software triggers, hadronic calorimetry, jet reconstruction and calibration techniques. She is currently developing trigger algorithms using GPUs as accelerators, for the ATLAS Phase II Upgrade. She is the advisor of 5 PhD thesis and 7 Master thesis. She was main contributor to 35 journal articles and 35 proceedings and ATLAS public notes. P. Conde Muíño is the Portuguese representative at the ECFA meetings, member of the ATLAS Executive Board and Portuguese National Contact Physicist at ATLAS.

In addition to research, she contributes to several outreach and education activities at LIP. P. Conde Muíño has given 20 presentations in outreach events and secondary schools; 11 interviews in

newspapers, TV or radio programmes and has participated in the organisation of four outreach events related to CERN and particle physics. She regularly participates in the MasterClasses of Particle Physics at IST and FCUL since 2008. She was the LIP seminar organiser from 2013–2018. She was the chair of the local organising committee of 5 conferences/workshops organised in Portugal, and participated in the scientific committee of three workshops. She is a member of the APPEC/ECFA/NUPECC task force on Diversity issues.

Selected references:

Conde Muíño, P. et al. (ATLAS Collaboration), (2018). Observation of H->bb decays and VH production with the ATLAS detector. *Physics Letters B* 786: 59–86. doi:10.1016/j.physletb.2018.09.013.

Conde Muíño P. et al. (ATLAS Collaboration). (2018). Performance of the ALAS trigger system in 2015. *The European Physical Journal C* 77 (5). doi:10.1140/epjc/s10052-017-4852-3.

Conde Muíño P. et al. (ATLAS Collaboration). (2015). Observation and measurement of Higgs boson decays to WW* with the ATLAS detector. *Physical Review D* 92 (1). doi:10.1103/physrevd.92.012006.



Patrícia Gonçalves

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Research areas & interests:

Patrícia Gonçalves is a Researcher at LIP, Laboratório de Instrumentação e Física Experimental de Partículas, where she coordinates the activities related to Space applications, in the field of Space Radiation Environment and Effects, She is also with the Portuguese group participating in the Pierre Auger Observatory and a member of the Geant4 collaboration. She is an Invited Assistant Professor with the Physics Department, at IST. Her Research interests include the Radiation Environment in Space and Effects, the development of energetic particle radiation detectors for future space missions, Ultra High Energy Cosmic Rays and simulation of the interaction of particles with matter.

Patrícia Gonçalves has given 12 outreach seminars in Basic and Secondary Schools, in the framework of the Ciencia Viva ESERO programme “O Espaço vai à Escola”, and she has also presented a public conference to a general audience on “Quantum Physics and Pseudoscience” (<http://concept.org/events/event/iv-conferencia-do-solsticio-fisica-quantica/>).

Selected references:

Arruda, L., Gonçalves P., et al. (2017). SEP protons in GEO measured with the ESA multifunctional spectrometer. *IEEE Transactions on Nuclear Science* 64 (8), pp2333. doi:10.1109/tns.2017.2714461.

Aab, A. et al. (2015). (2014). Searches for anisotropies in the arrival directions of the highest energy cosmic rays detected by the Pierre Auger Observatory. *The Astrophysical Journal*. 804. doi:10.1088/0004-637X/804/1/15.

McKenna-Lawlor, S., Gonçalves, P., et al. (2012). Characterization of the particle radiation environment at three potential landing sites on Mars using ESA’s MEREM models. *Icarus*, 218(1), 72–734. doi:10.1016/j.icarus.2011.04.004.



Pedro Abreu

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Research areas & interests:

Pedro Abreu works at LIP on communication and outreach in particle and astroparticle physics and on data analysis and algorithms at the Pierre Auger Observatory. As a member of the Pierre Auger Collaboration has co-authored 10 papers published in international journals with peer review in years 2018 and 2019.

Pedro Abreu was the chairman of the Local Organizing Committee of the IPHO’2018 – 49th International Physics Olympiad, Lisboa, Portugal, and a member of the Local Organizing Committee of the EUSO’2019 – 17th European Union Science Olympiad, Almada, Portugal; has given 64 outreach seminars at high-schools and public sessions, and organized and participated in about 5 outreach events. He is also the Portuguese representative in the CERN – European Particle Physics Communication Network, in the CERN High Schools and Teachers forum, and is also the LIP delegate to the IPPOG – International Particle Physics Outreach Group. Since 2010 and until February 2019 was also President of the South and Isles Delegation of the Portuguese Physics Society, and since then President of the Fiscal and Review Council of the said Society.

Selected references:

Abreu, P., Andringa, S., Diogo, F., & Espírito Santo, M. (2016). Questions and answers in extreme energy cosmic rays: a guide to explore the data set of the Pierre Auger Observatory. *Nuclear and Particle Physics Proceedings*, 273–275, 1271–1275. doi:10.1016/j.nuclphysbps.2015.09.203.

Electroweak measurements in electron-positron collisions at W-boson-pair energies at LEP. (2013). *Physics Reports*, 532(4), 119–244. doi:10.1016/j.physrep.2013.07.004.

Abreu, P. “As escolas de professores no CERN em língua portuguesa” (2015), in Dias Garcia, N. M. (Ed.), *Nós, professores brasileiros de física do ensino médio, estivemos no CERN* (pp. 37–58), São Paulo, Sociedade Brasileira de Física, Editora Livraria da Física. ISBN: 978-85-7861-316-7.



Pedro Assis

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Research areas & interests:

P. Assis specializes in experimental particle and astroparticle physics. His work has been developed in the context of several international collaborations developing data acquisition systems for which he has taken great responsibilities. P. Assis is member of the Auger Collaboration and has authored papers with great impact on CR astrophysics. P. Assis also participates in LIP activities with the European Space Agency to study the radiation environment in space and its effects in components. P. Assis has published more than 90 papers in international peer review journals and more than 25 papers in proceedings of international conferences. Researcher ID gives a sum of the times cited of 4280 with an h-index of 29. Has authored more than 250 proceedings as an Auger Collaborator.

Selected references:

The Pierre Auger Collaboration. (2015). The Pierre Auger Cosmic Ray Observatory. *Nuclear Instruments and Methods in Physics Research A*, 798 172–213. doi:10.1016/j.nima.2015.06.058.

Lopes, L., Assis, P., Blanco, A., Cerda, M., Carolino, N., Cunha, O., Ferreira, M., Fonte, P., Mendes, L., Palka, M., Pereira, A., Pimenta, M., Tomé, B. (2014). Resistive plate chambers for the Pierre Auger array upgrade. *Journal of Instrumentation*, 9(10), C10023–C10023. doi:10.1088/1748-0221/9/10/c10023.

The Pierre Auger Collaboration. (2017). Observation of a large-scale anisotropy in the arrival directions of cosmic rays above 8×10^{18} eV. *Science* 357 issue 1266. doi:10.1126/science.aan4338.



Pedro Bicudo

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Research areas & interests:

Pedro Bicudo has been interested in QCD, colour and confinement since he read a scientific journal as a teenager in the seventies. He is a member of the Theory Group of CeFEMA, where he has research grants on QCD-inspired non-perturbative methods and models applied to the study of QCD vacua and its replicas, the confinement of colour, the spontaneous breaking of chiral symmetry, and exotic hadrons such as tetraquarks or hybrids. He also applies High Performance Computing and utilize GPUs for massively parallel processes. c++ and CUDA codes for CPU and GPU servers to develop non-perturbative field theory, including Lattice QCD. Moreover he has been developing technology for surfing and environment. He has published more than 80 papers in international journals, supervised many BSc and MSc thesis, and 4 PhD thesis.

The most important contribution to society from Pedro Bicudo has been his high level teaching and scientific research at the University of Lisboa and in his collaborations with other universities, where he motivated hundreds of young people to understand science and nature. At a lower level, Pedro Bicudo had been interviewed in circa 10 TV programs and written circa 100 general articles in newspapers, since his main outreach is

surf technology and coastal preservation: Surf forecasts (1995); Surf website (1995); Articles in popular media (1999); Surf break saving (2002); Surf physics colloquia (2003); Surf industrial patent (2007); Artificial surf reef design (2007); Surf numerical model (2007); Surf international article (2008); Surf physical model (2008); Surf impact assessment (2008); CNC surfboard prototype (2009); Surf economy forecast (2009); Surf environment NGO (2012).

Selected references:

Bicudo, P. and Ribeiro, J. (1990). Current quark model in a ppp wave triplet condensed vacuum. The dynamical breaking of chiral symmetry. *Physical Review D* 42 1611–1624. doi:10.1103/PhysRevD.42.1611.

Bicudo, P. and Wagner, M. (2013). Lattice QCD signal for a bottom-bottom tetraquark. *Physical Review D* 87 (2013) 11, 114511. doi:10.1103/PhysRevD.87.114511.

Cardoso, N., Cardoso, M. and Bicudo, Pedro. Inside the SU(3) quark-antiquark QCD flux tube: screening versus quantum widening. *Physical Review D* 88 (2013) 054504. doi:10.1103/PhysRevD.88.054504.



Pedro Brogueira

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Area: Condensed Matter & Nanotechnology

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Research areas & interests:

Pedro Brogueira main scientific topics of research are scanning probe microscopy, semiconductor materials and devices, energy and particle physics detectors. His expertise covers vacuum technology; thin film deposition, PVD and CVD; optical, transport and structural thin film characterization; data acquisition systems design and implementation. He has been responsible for the Mechanics course for Physics Engineering first year students. He was coordinator of the Engineering Physics and of the Biomedical Engineering degrees of IST, member of the Pierre Auger Collaboration, President of the Physics Department and of the Center of Physics and Engineering of Advanced Materials (CeFEMA) and he is presently the coordinator of the Scientific Area of Condensed Matter and Nanotechnology.

Pedro Brogueira co-authored more than 180 scientific papers in international journals, 2 teaching books, 20 science videos broadcasted nationwide (one minute each), 3 science exhibitions and a science itinerary project for the Ministry of Education and Science and chaired the Commission for the Teaching Model and Pedagogical Practices of Instituto Superior Técnico (CAMEPP).

Selected references:

Vygranenko, Y., M. Vieira, M., Lavareda, G., de Carvalho, C. N., Brogueira, P., Amaral, A., Barradas, N. P., and Alves, E. (2019). Optical and photoconductive properties of indium sulfide fluoride thin films. *Thin Sol. Films* 671, 49. doi:10.1016/j.tsf.2018.12.019.

Assis, P., Blanco, A., Brogueira, P., Ferreira, M., and Luz, R. (2018). The MARTA (Muon array with RPCs for tagging air showers) front-end acquisition system. *IEEE Trans. On Nuc. Sci.* 65, 2920. doi:10.1109/TNS.2018.2879089.

Dias de Deus, J., Pimenta, M., Noronha, A., Penha, T., Brogueira, P. (2014). *Introdução à Física*. Escolar Editora, 3rd Edition. ISBN 9789725924402.



Pedro Ribeiro

Invited Assistant Professor

Area: Condensed Matter & Nanotechnology

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Research areas & interests:

I am a researcher at the Center of Physics and Engineering of Advanced Materials (CeFEMA), Lisbon and an invited Professor at the Physics Department of Instituto Superior Técnico (IST). Previously, I was a research fellow at Russian Quantum Center (RQC), Moscow (2014–2015), a postdoctoral fellow at Centro de Física das Interações Fundamentais (CFIF), IST, Lisbon (2013–2014 and 2008–2011), at the MPI-PKS, Dresden (2011–2013), and at the Condensed Matter Theory Group of MIT, Cambridge USA (2009–2010). I obtained my PhD in 2008 from UPMC, Paris-VI. My research has been developed within the fields of Condensed Matter and Quantum Information. My current interests focus on aspects of open quantum systems driven away from equilibrium. This research line provides a route to novel phases of matter with exotic properties that are impossible at equilibrium and have potential applications in thermoelectrics, electronic and sensing devices and quantum information processing.

Outreach:

Article explaining the Physics Nobel Prize in 2016. E. Castro, P. Ribeiro. “O que há de topológico na matéria que nos rodeia? Trocando por miúdos o Nobel da Física de 2016.” (in Portuguese), *Gazeta da Física*./Coordination and participation on the

Open Lab Day at the Theoretical Group of CeFEMA. Students visits to the center to get to know the researcher and research topics. IST, Lisbon, 2017./Seminar explaining the Physics Nobel Prize 2016 to colleagues of other areas, CeFEMA workshop 2016, IST, Lisbon 2016./Outreach article explaining some of the current research lines in non-equilibrium physics./P. Ribeiro, Perder o equilíbrio... (in Portuguese), *Pulsar*, 2015–2016;

Selected references:

Ribeiro, P., Zamani, F., & Kirchner, S. (2015). Steady-state dynamics and effective temperature for a model of quantum criticality in an open system. *Physical Review Letters*, 115(22). doi:10.1103/physrevlett.115.220602.

Ribeiro, P., & García-García, A. M. (2012). Theoretical description of the superconducting state of nanostructures at intermediate temperatures: a combined treatment of collective modes and fluctuations. *Physical Review Letters*, 108(9). doi:10.1103/physrevlett.108.097004.

Ribeiro, P., & Mosseri, R. (2011). Entanglement in the symmetric sector of n qubits. *Physical Review Letters*, 106(18). doi:10.1103/physrevlett.106.180502.



Pedro D. Sacramento

Associate Professor with “Agregação”

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Research areas & interests:

Pedro D. Sacramento works in Theoretical Condensed Matter Physics and his main research interests are Topological phases of matter, Quantum information and condensed matter physics, Non-equilibrium dynamics, Strongly correlated systems, Fractionalization and confinement, Unconventional behavior in electronic systems, Disorder and magnetic field effects in superconductors and Magnetism and superconductivity. He has published 117 papers.

Pedro D. Sacramento has organized or co-organized several conferences, workshops and schools both national and international. Also, has given colloquia and short courses both locally and abroad.

Selected references:

Schlottmann, P., & Sacramento, P. (1993). Multichannel Kondo problem and some applications. *Advances in Physics*, 42(6), 641–682. doi:10.1080/00018739300101534.

Sacramento, P. D. (2014). Fate of Majorana fermions and Chern numbers after a quantum quench. *Physical Review E*, 90(3). doi:10.1103/physreve.90.032138.

Tešanović, Z., & Sacramento, P. D. (1998). Landau levels and quasiparticle spectrum of extreme type-II superconductors. *Physical Review Letters*, 80(7), 1521–1524. doi:10.1103/physrevlett.80.1521.



Pedro Sebastião

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Research areas & interests:

More than 70 international publications in peer-review. 3 chapters in scientific books. A book published. A Portuguese patent. 6 PhD students (5 completed), 7 master students in Physics/Engineering Physics/Materials Engineering. Supervisor of more than 11 students graduate and post-doc in research internships of more than three months. Regular national collaborations (Universidade Nova de Lisboa, Universidade de Coimbra) and international (Universidade Federal de Rio de Janeiro, University of Ljubljana, University of Pisa). Leader of the Fast Field Cycling NMR development team (3 developed prototypes, one in continuous operation since 2009). Software developer for data analysis and functions fitting made available through the web service at <http://fitteia.org> to the community of users around the world. Management activities by the Center of Physics and Engineering of Advanced Materials, as President, by the Executive of the Department of Physics, as vice-president, by the Coordination Commission of the MSc in Engineering Physics IST, as vice-coordinator, and by Portuguese Society of Physics, as vogal. Software development dedicated to supporting

the management of students in Experimental Physics and management of surveillance tests in the Department of Physics of IST. Teacher-rated “Excellent” in the years 2012-2016.

Selected references:

Daniel, C. I., Vaca Chávez, F., Feio, G., Portugal, C. A., Crespo, J. G., & Sebastião, P. J. (2013). 1H NMR relaxometry, viscometry, and PFG NMR studies of magnetic and nonmagnetic ionic liquids. *The Journal of Physical Chemistry B*, 117(39), 11877–11884. doi:10.1021/jp4078536.

Domenici, V., Gradišek, A., Apih, T., Hamplová, V., Novotná, V., & Sebastião, P. J. (2016). 1H NMR relaxometry in the TGBA* and TGBC* phases. *Ferroelectrics*, 495(1), 17–27. doi:10.1080/00150193.2016.1136725.

Sebastião, P. J., Monteiro, M. S., Brito, L. M., Rodrigues, E., Chávez, F. V., & Tavares, M. I. (2016). Conventional and fast field cycling relaxometry study of the molecular dynamics in polymer nanocomposites for use as drug delivery systems. *Journal of Nanoscience and Nanotechnology*, 16(7), 7539–7545. doi:10.1166/jnn.2016.12476.



Pietro Faccioli

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Research areas & interests:

Within the CMS experiment P. F. leads the quarkonium polarization analyses. He was senior sub-convenor of the CMS Beauty-physics analysis group. He is involved in the writing of all CMS publications on quarkonium physics. He is member of the CMS publication board for heavy-ion papers. He is PI of a FCT project hosted by LIP on quarkonium production phenomenology. He demonstrated a theorem providing a new interpretation and generalization of the Lam-Tung identity (a key relation in the theory of Drell-Yan production), triggering a change of paradigm in the way experiments measure dilepton polarizations. He presented his research in many invited talks and seminars (CERN, Fermilab, Brookhaven, DESY, Vienna, Israel, Zürich, Beijing). In the last 10 years he was principal author of 15 high-impact publications with few co-authors, 6 peer-reviewed conference proceedings, 2 HERA-B and 10 CMS papers, 2 CERN Courier articles and 11 CMS analysis notes.

Selected references:

Faccioli, P., Lourenço, C., Seixas, J., & Wöhri, H. K. (2010). Towards the experimental clarification of quarkonium polarization. *The European Physical Journal C*, 69(3-4), 657–673. doi:10.1140/epjc/s10052-010-1420-5.

Faccioli, P., Lourenço, C., & Seixas, J. (2010). Rotation-invariant relations in vector meson decays into fermion pairs. *Physical Review Letters*, 105(6). doi:10.1103/physrevlett.105.061601.

Faccioli, P., Knünz, V., Lourenço, C., Seixas, J., & Wöhri, H. K. (2014). Quarkonium production in the LHC era: A polarized perspective. *Physics Letters B*, 736, 98–109. doi:10.1016/j.physletb.2014.07.006.



Reinhard Schwarz

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Research areas & interests:

Reinhard Schwarz studied Physics and Mathematics at the University of Stuttgart, Germany, and did a PhD in Experimental High Energy Physics at the University of Neuchâtel, Switzerland. After a postdoc period at Princeton University, he started his own research group at the Technical University of München, Germany. He focused on thin film solar cells and on transport studies in amorphous silicon superlattices. He is co-author of some 250 publications in refereed journals and conference proceedings and co-inventor of a cyclic chemical vapor deposition method. Since 1996, he is an associate professor at the Physics Department of Instituto Superior Técnico, Lisbon, Portugal, with research on wide-band gap semiconductors and lead-free ferroelectrics prepared by pulsed laser deposition.

Selected references:

Schwarz, R., Slobodin, D., & Wagner, S. (1985). Differential surface photovoltage measurement of minority-carrier diffusion length in thin films. *Applied Physics Letters*, 47(7), 740–742. doi:10.1063/1.96023.

Gu, Q., Schiff, E. A., Grebner, S., Wang, F., & Schwarz, R. (1996). Non-Gaussian transport measurements and the Einstein relation in amorphous silicon. *Physical Review Letters*, 76(17), 3196–3199. doi:10.1103/physrevlett.76.3196.

Niehus, M., Sanguino, P., Schwarz, R., Monteiro, T., Soares, M., Pereira, E., Kunst, M. and Koynov, S. (2003). Low temperature photoluminescence, transient photoconductivity and microwave reflection for optical properties and transport in PLD-GaN. *physica status solidi (c)*, 0(1), 386–391. doi:10.1002/pssc.200390069.

Schwarz, R., Santos, L., Ayouchi, R., Bhattacharyya, S. R., Mardolcar, U., Leal, M., & Kholkin, A. (2013). Optical properties of lead-free NKN films from transmission and spectral ellipsometry. *Ferroelectrics*, 446(1), 118–127. doi:10.1080/00150193.2013.821018.

Tolstogousov, A., Aguas, H., Ayouchi, R., Belykh, S. F., Fernandes, F., Gololobov, G. P., ... Teodoro, O. M. (2016). Vacuum solid-state ion-conducting silver source for application in field emission electric propulsion systems. *Vacuum*, 131, 252–258. doi:10.1016/j.vacuum.2016.07.003.



Ruben Conceição

Invited Assistant Professor

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Research areas & interests:

Ruben Conceição (RC) is a member of the Pierre Auger Observatory, an experiment dedicated to the study of Ultra High Energy Cosmic Rays. Besides participating in the data analysis he has published several works on the Extensive Air Shower phenomenology with particular focus on the study of hadronic interactions at energies above those reached by human-made accelerators. Ruben is also Co-PI of a project to build a wide field-of-view gamma-ray experiment in the Southern Hemisphere (SWG0, www.swgo.org). He has supervised 2 Master students (1 on-going). RC has published 99 paper (11 short author) and has a h-index of 58.

Ruben Conceição has participated in several outreach and inreach events, for instance: Invited talk about High-energy multi-messengers at LIP/CFTP winter school, Invited talk about Pierre Auger Observatory at Hands on Particles and Light Workshop, Master Class: Hands-On Particles (IST). RC has also organized a several Schools and Symposiums about Data Science and its connection between Academia and Industry, see for instance: <http://www.lip.pt/events/2019/data-science>.

Selected references:

The Pierre Auger Collaboration/Aab, A., et al. (2017). Observation of a large-scale anisotropy in the arrival directions of cosmic rays above 8×10^{18} eV. *Science* 357 no.6537, 1266–1270. doi:10.1126/science.aan4338.

The Pierre Auger Collaboration/Aab, A., et al. (2019). Measurement of the average shape of longitudinal profiles of cosmic-ray air showers at the Pierre Auger Observatory. *JCAP* 03 (2019) 018. doi:10.1088/1475-7516/2019/03/018.

Cazon, L., Conceição, R., Riehn, F. (2018). Probing the energy spectrum of hadrons in proton air interactions at ultrahigh energies through the fluctuations of the muon content of extensive air showers. *Physics Letters B* 784 68–76. doi:10.1016/j.physletb.2018.07.026.



Rui Coelho

Assistant Investigator

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Research areas & interests:

Rui Coelho research addresses several aspects of theory and modelling in fusion devices in particular regarding the calculation of plasma equilibrium and MHD stability of magnetically confined plasmas in Tokamaks. He has a solid experience in integrated tokamak modelling in international teams both as a contributing member and as task, area coordinator and scientific team management. He has authored/co-authored about 80 papers in international journals and has been nominated to technical review panels and scientific boards in International Organisations in support of Fusion Research. He has supervised 1 PhD and 4 MSc thesis and secured one high performance computing project in a collaboration between EU and Japan.

Rui Coelho has welcomed several IST summer internships on his research group, given talks about Nuclear Fusion in high schools and promoted his group activities developing a dedicated webpage and answering outreach calls by international students inquiring thesis opportunities.

Selected references:

Nabais, F., Aslanyan, V., Borba, D., Coelho, R., Dumont, R., Ferreira, J., Figueiredo, A., Fitzgerald, M., E. Lerche, E., Mailloux, J., Mantsinen, M., Rodrigues, P., Porkolab, M., Puglia, P., Sharapov, S. E., and JET Contributors (2018). TAE stability calculations compared to TAE antenna results in *JET*. *Nucl. Fusion* 58, 082007. doi:10.1088/1741-4326/aabdbd.

Iannone, F., Bracco, G., Cavazzoni, C., Coelho, R., Coster, D., Hoenen, O., Maslennikov, A., Migliori, S., Owsiak, M., Quintiliani, A., Palak, B., Pais, V., Robin, F., Rossi, E., Voitsekhovitch, I. (2018). MARCONI-FUSION: The new high performance computing facility for European nuclear fusion modelling. *Fusion Engineering and Design* 129, 354 (2018). doi:10.1016/j.fusengdes.2017.11.004.

Coelho, R. et al., (2018). Plasma equilibrium reconstruction of JET discharges using the imas modelling infrastructure. *TH/P5-27 IAEA CN-258*.



Rui Dilão

Assistant Professor with “Agregação”

Area: Interdisciplinary physics

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Research areas & interests:

Rui Dilão is expert in Mathematical Physics and Dynamical Systems. In 1986, he obtained the PhD in Physics (Mathematical Physics) from the Technical University of Lisbon and, in 1997, the “Agregação” from the same university. In 1986–1988 he collaborated in the planning of the LHC as a fellow at CERN, and in 1991–93 in the scientific program of PoSAT-1 (1992–1993). He received the LabMed prize in 1999 for work on laboratorial research medicine. He is author of 70+ publications and presented 100+ communications in the academia and research meetings. He has supervised 4 PhD and 50 MSc thesis, and served as advisor of 4 postdoc researchers. He has co-authored a research book on dynamical system techniques for the design of particle accelerators. He has written two books for undergraduate teaching and a two-booklet set for the middle school level.

On a regular basis, he serves as referee for several academic journals, as member of the steering committees of 2 research programs of the European Science Foundation and participates as expert in the evaluation of the Marie Skłodowska-Curie In-

dividual Fellowships. He participated as principal investigator in one of the work packages of the project GENNETEC (2006–2009) supported by the European Commission. He organized several research meetings in Portugal and abroad and has edited several proceedings monographs. He is member of several professional societies.

Selected references:

J. Cascais, J. Dilão, R., and Noronha da Costa, A. (1983). *Chaos and reverse bifurcations in a RCL circuit*. *Physics Letters A*, 93 213–216, doi:10.1016/0375-9601(83)90799-5.

Alcobia, I., Dilão, R., Parreira, L. (2000). *Spatial association of centromeres in the nuclei of hematopoietic cells: Evidence for cell-type-specific organizational patterns*. *Blood*, 95 1608-1615. Erratum: *Blood*, 96 (2000) 987. doi:10.1182/blood.V95.5.1608.005k32_1608_1615.

Dilão, R. (2009). *Anti-phase and in-phase synchronization of nonlinear oscillators: The Huygens’s clocks system*. *Chaos*, 19 023118, doi:10.1063/1.3139117.017-0653-9.


Samuel Eleutério

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Research areas & interests:

Simulation in Polymers: calculation of Flory index with models of fractional Brownian motion. Sentiments influence applies to the dynamics of the market. “Excellent Teacher” distinction at IST in 2016 and 2017. Scaling Properties of Weakly Self-Avoiding Fractional Brownian Motion in One Dimension Journal of Statistical Physics.


Sérgio Ramos

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Research areas & interests:

Structure of matter, in the COMPASS experiment at CERN (and previously in the NA51 Expt. at CERN): transverse momentum dependent parton distribution functions, through the polarised Drell-Yan process; gluon polarisation; quark helicity and transverse distributions. Heavy ion collisions, in the HADES experiment at GSI (and previously in the NA38 and NA50 expts. at CERN): properties of matter at high density; dielectron and strange particle detection.

2002–2017 Co-responsible for the LIP portuguese group of the experiment COMPASS at CERN, annual Projects financed by FCT.

1990–2004: Co-responsible for the LIP Portuguese group of the NA50 experiment at CERN, annual Projects financed by FCT.

1992–1993: Co-responsible for the LIP portuguese group of the experiment NA51 at CERN.

1986–1992 Co-responsible for the LIP portuguese group of the NA38 experiment at CERN, annual Projects financed by FCT.

160 Publications in International Journals with Peer Review, of which 30 Publications have more than 100 citations, in accordance to inSPIRE.

Supervision of several PhD Theses, and several Pre-Bologna and Bologna Master Theses.

Member of the organizing committee of the biennial conference: XIII International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions, which took place in Peniche, in June 2018.

Selected references:

COMPASS Experiment. (2007). The deuteron spin-dependent structure function g_1^d and its first moment. *Physics Letters B* 647 8. (333 citations).

NA50 Experiment, Abreu, M.C. et al. (2000). Evidence for deconfinement of quarks and gluons from the J/ψ suppression pattern measured in Pb-Pb collisions at the CERN-SPS, *Physics Letters B* 477 28. (442 citations). doi:10.1016/S0370-2693(00)00237-9.

NA51 Experiment, Baldit, A. et al. (1994). Study of the isospin symmetry breaking in the light quark sea of the nucleon from the Drell-Yan process. *Physics Letters B*. 332. 244–250. (383 citations) doi:10.1016/0370-2693(94)90884-2.



Susana Cardoso de Freitas

Associate Professor

Area: Condensed Matter & Nanotechnology

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Research areas & interests:

Susana Cardoso de Freitas is one of the Directors at INESC-MN and is responsible for student coordination and educational activities related with nanoelectronics, microfabrication and spintronics. She has supervised 70 MSc thesis and 6 PhD thesis (12 on-going). She was appointed coordinator for the Educational Activities of the IEEE Portugal section in 2015. She has coordinated and participated as principal researcher in several EU (ICT, SME-Inst, FTI) and national projects (ANI, FCT), and is also an expert evaluator for the H2020 program and other European agencies. Her activity includes intensive collaborations with industrial partners for technology transfer related with sensors and holds 3 patents. Since 2019 she is one member of the “Ambassador for the Innovation” group at IST.

Susana Cardoso de Freitas has been invited for 15 international conferences and is co-author of over 300 publications and 20 chapter books. She was a recipient of the Honorable Mention in Scientific Awards ULisboa/Santander in 2016, 2017 and 2018. In 2018 she was selected as one of “100 Women in Science” by the Portuguese Agency of Science and Technology “Ciência Viva”. In 2019

she was Elected Associate Member Delegate to the European Physics Society (EPS) Council (2019). She is involved in a number of international clusters and networks: KET Tools (EU Infrastructure Cluster) and SpintronicFactory (European Network on Magnetism) and is the responsible for the INESC-MN participation in the INTERFACE program from Agencia de Inovação.

Selected references:

Chowdhury, N., Kleemann, W., Petracic, O., Kronast, F., Doran, A., Scholl, A., Cardoso, S., Freitas, P. P., and Bedanta, S. 360° domain walls in magnetic thin films with uniaxial and random anisotropy. *Physical Review Letters* 98, 134440. doi:10.1103/PhysRevB.98.134440.

Freitas, P. P., Ferreira, R., and Cardoso, S. Spintronic sensors. (2016). *Proceedings of the IEEE*, 104 (10), pp. 1894–1918. doi:10.1109/JPROC.2016.2578303.

Romão, V. C., Martins, S. A. M., Germano, J., Cardoso, F. A., Cardoso, S., Freitas, P.P. (2017). Lab-on-chip devices: Gaining ground losing size. *ACS Nano* 11 (11), pp 10659–10664. doi:10.1021/acsnano.7b06703.



Teresa Peña

Full Professor

Area: Particle Physics & Nuclear Physics

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Research areas & interests:

Teresa Peña works in Nuclear and Hadronic Physics. Her recent work is on spectroscopy and structure of mesons and baryons, with challenging questions on properties of matter under extreme conditions, in accelerators, or in the merger of stars. In addition, it contributes to technological applications, as medical imaging and radiation therapy, with large benefits to the society. The research covers questions such as: What binds nucleons in nuclei? How do quarks acquire mass? What does the emissivity of matter tell us about the early universe? What are the radiation protection procedures for safe space travel and clinical procedures?

On Women’s Day, 2016, she was given a tribute by Ciência Viva, and in 2011 the “René Glidden” Professorship distinction from the University of Ohio, for “...artistic, engineering, historical, literacy and scientific achievements”. She authored an international publication “Nucleus – A trip to the heart of matter”, translated into 5 european languages. At the CTN campus Teresa Peña participates in socially relevant projects on Biomedical Applications of Nuclear Technologies. In 2017, she delivered two invited talks: at ECT*, the European Center for Theoretical Studies in Nuclear Physics, and at the Nuclear Physics Eu-

ropean Collaboration Committee. She organized the Colloquia of the Physics Department, and an International Conference, LightCone 2016. She is a member of the European Research Committee on Few-Body Problems, and of the International Light Cone Advisory Committee, ILCAC. She is a member of the Executive Committee of the European Physical Society. During 2016–2017 she supervised 2 Master and 1 PhD students.

Selected references:

Biernat, E. P., Gross, F., Peña, M. T., Stadler, A., & Leitão, S. (2018). Quark mass function from a one-gluon-exchange-type interaction in Minkowski space. *Physical Review D* 98 (2018) no.11, 114033. doi:10.1103/physrevd.98.114033.

Eichmann, G., Duarte, P., Peña, M. T., & Stadler, A. (2019). Scattering amplitudes and contour deformations. *Physical Review D*, 100(9). doi:10.1103/physrevd.100.094001.

Tuccori, N., Pinheiro, T., Peña, T., Alves, L. C., Botelho, M. J., Raimundo, J. and Vale, C. (2019). Modelling the uptake of suspended materials and sands in nearshore waters by plastics using the nuclear microscopy and depth profiling analytical tools. *Nucl. Inst. and Methods in Phys. Res. B* 451 127–134. doi:10.1016/j.nimb.2019.05.036



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Area: Plasma Physics, Lasers & Nuclear Fusion

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Research areas & interests:

Vasco Guerra develops kinetic models to study non-equilibrium processes in low-temperature plasmas. He is currently interested in understanding how to take advantage of the internal degrees of freedom of the CO₂ molecule to promote its recycling to produce green fuels on Earth and oxygen on Mars. He has been responsible of the courses of Thermodynamics and the Structure of Matter and Plasma Physics and Technology. He was awarded the William Crookes Prize in 2016, sponsored by the European Physical Society and the Institute of Physics, for the outstanding contribution to the modeling of molecular low-temperature plasmas, and was awarded a Visiting Professor fellowship from the Royal Netherlands Academy of Arts and Sciences (KNAW) to stay at the Dutch Institute For Fundamental Energy Research (DIFFER) during his sabbatical leave in 2019. He was the Coordinator of the Master in Engineering Physics in 2018 and is currently member of the Scientific Council of IST and programme director of the PhD programme AP-PLAuSE (Advanced Programme in Plasma Science and Engineering)

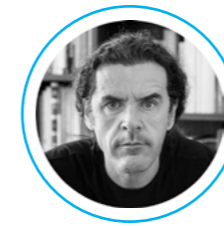
Vasco Guerra has given outreach seminars at high schools and at the Summer Academy for Learning and Science Olympiads at IST.

Selected references:

Guerra, V., Tejero del Caz, A., Pintassilgo, C. D., and Alves, L. L. (2019). Topical review: Modeling N₂-O₂ plasmas: volume and surface kinetics. *Plasma Sources Sci. Technol.* 28 073001. doi:10.1088/1361-6595/ab252c.

Guerra, V., Silva, T., and Guaitella, O. (2018) Living on Mars: how to produce oxygen and fuel to get home. Feature Article in *Europhysics News* 49(3) 15–18. doi:10.1051/epn/2018302.

Alves, L. L., Bogaerts, A., Guerra, V., and Turner, M. (2018). Topical Review: ‘Foundations of modelling of nonequilibrium low-temperature plasmas’. *Plasma Sources Sci. Technol.* 27 023002. doi:10.1088/1361-6595/aaa86d.1-2,1600175. doi:10.1002/ppap.201600175.



Vítor Cardoso

Full Professor

Area: Astrophysics & Gravitation

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Research areas & interests:

Vítor Cardoso is Professor of Physics at IST, where he leads the GRIT at CENTRA. His research interests are mainly focused on strong-gravity problems, with implications for gravitational-wave and black-hole physics, high-energy and particle physics. He is co-author of one book and of over 200 scientific papers. His research was recognized by the European Research Council, with two prestigious ERC Grants. In 2015 he was awarded the “Ordem de Sant’Iago da Espada” title, for scientific achievements, by the President of the Portuguese Republic. Prof. Cardoso is currently the Chair of GWverse, an international Consortium of over 30 countries and hundreds of scientists, which aims to study black holes, gravitational waves and fundamental physics. He is a founding member of the Portuguese Society for Relativity and Gravitation.

Vítor Cardoso, together with artist Ana Carvalho, created Gravitão (<https://blackholes.tecnico.ulisboa.pt/gravitao>) and Atelier Cósmico (<http://ateliocosmico.tecnico.ulisboa.pt>), outreach efforts

for high-schools and general audiences, as well as The Birth of an Idea (<https://birthofidea.tecnico.ulisboa.pt>), where fellow scientists share their thoughts about the genesis of scientific ideas. Vítor Cardoso is a regular presence in the Portuguese mainstream media, most notably in newspapers and TV shows.

Selected references:

Cardoso, V. and Pani, P. (2017). Tests for the existence of black holes through gravitational wave echoes. *Nature Astronomy* 1, no. 9, 586. doi:10.1038/s41550-017-0225-y.

Brito, R., Cardoso, V., & Pani, P. (2015). *Superradiance, Lecture notes in physics*. Springer-Verlag. eBook ISBN: 978-3-319-19000-6.

Cardoso, V., Costa, J. L., Destounis, K., Hintz P., & Jansen, A. (2018). Quasinormal modes and strong cosmic censorship. *Physics Review Letters* 120:031103. doi:10.1103/PhysRevLett.120.031103.



Vítor João Rocha Vieira

Invited Full Professor

Area: Condensed Matter & Nanotechnology

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Research area & interests:

Strongly correlated electron and spin systems. Low-dimensional systems. Phase space representations of quantum mechanics. Nonperturbative methods. Systems far from equilibrium. Real time formalisms. Quantum thermodynamics. Quantum stochastic processes. Quantum information and computation.

Teaching:

Many Particle Systems and Critical Phenomena, Advanced Condensed Matter Physics, Statistical Mechanics and Phase Transitions, Condensed Matter Physics, Topics of Condensed Matter Physics, Physics Seminar.

Scientific orientation of several Master and PhD students.

Coordinator of the PhD Doctoral Programmes of the Physics Department (1999–2014, 2012–2016).

Selected references:

Mera, B., Vlachou, C., Paunković, N., & Vieira, V. R. (2017). Uhlmann connection in fermionic systems undergoing phase transitions. *Physical Review Letters*, 119(1). doi:10.1103/physrevlett.119.015702.

Vieira, V., & Sacramento, P. (1995). Path integrals of spin-J systems in the holomorphic representation. *Nuclear Physics B*, 448 (1–2), 331–354. doi:10.1016/0550-3213(95)00196-y.

Vieira, V. R. (1989). Finite-temperature real-time field theories for spin 1/2. *Physical Review B*, 39(10), 7174–7195. doi:10.1103/physrevb.39.7174.

ADMINISTRATIVE STAFF



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Administrative duties:

Ana Bela Cardoso's main activity is the support of the MEFT Coordination. She is responsible for the organization and structure of the Secretariat regarding the course "MEFT Project", including the disclosure of videos in a public website.

She is responsible for the procedures required for the submission and public presentation of the final masters dissertation by MEFT students. She also supports the "Welcome Week" for 1st year MEFT students and other events held in the Department of Physics. She is also in charge of the different aspects related to the MEFT students in ERASMUS.



Daniel de Jesus Mendes Lála

Technical Assistant

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Administrative duties:

Daniel Lála works as a technician in the various laboratories, namely the Electronics, the Technological, and the DEMO – Demonstrations Laboratories.

He also supports the filming and the production of short videos for the UC "Project MEFT" and provides technical support in various laboratories of the Department of Physics in the field of electronics. In 2015, he provided major support to the installation of the new laboratory for the "Project MEFT".



Dulce Maria Martins da Conceição
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Administrative duties:

Dulce Conceição is a Senior Technician in the Department of Physics. She provides secretariat duties for CENTRA and CEFEMA.



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Administrative duties:

Fátima Correia's main activity is to support the DF's secretariat. She is involved in the support of students in daily activities, mail service (internal and external), management of various displays with information about department's activities. She is also involved with the archive of Assessment tests and written exams.



Helder Carvalho
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Administrative duties:

Helder Carvalho provides technical support to the Experimental Physics Laboratories (Thermodynamics and Structure of Matter, Electromagnetism and Optics, Mechanics and Waves) and the LFEB (Basic Experimental Physics Laboratory) and LOO (Oscillations and waves Laboratory) Laboratories of MEFT.



João Paulo dos Santos Guerreiro
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Administrative duties:

João Paulo Guerreiro's main activity is to support the management and coordination of tasks of the Executive Commission of the DF in the following areas: teaching, including organization of teaching activities; teaching permit applications for foreign employees; processing of the application of the Teaching Service Provision Regulation (RSD); order Sabbatical leaves; teacher hiring guests under Clause 32a of ECDU; management of monitor's applications for assessment tests (tests and exams) of course units under the department's responsibility.

He is also in charge of the procedures related with scholarships to support educational activities. He participates in the organization of events organized by the DF and the MEFT coordination, such as the workshop "MEFT – Challenging the Limits of Science and Technology" and the "Welcome Week at IST".

He gives crucial support in the management and full implementation of funds allocated to the DF, in accordance with the decisions of the department's executive commission.


Martinha Viegas de Sousa
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Administrative duties:

Martinha Viegas de Sousa's main activity is the secretariat of MEFT Coordination. Such work includes the schedule for MEFT procedures, compilation and completion of documents necessary for the process of annual assessment of MEFT, preparation of the beginning of each semester meetings.

She also provides the secretariat of the "Welcome Week", a DF initiative dedicated to new MEFT students and "MEFT – Challenging the Limits of Science and Technology", a department's initiative for high school students.

She has been working on an effective implementation at the MEFT Secretariat of the administrative procedures in accordance with the changes and innovation of the various IST services to improve the quality efficiency of the secretariat support to the MEFT coordination.

Martinha Viegas de Sousa has been in charge of maintaining updated information related to the UCs MEFT, DEAF, DEAEFT in the Portal Bologna. In 2015, she was involved in publication of the report for the process of MEFT Accreditation.


Pedro Claro
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Administrative duties:

Pedro Claro provides support for the Technological Laboratory. He is an expert in the fields of welding and works on metal parts. He also gives technical support to the DF in various areas.


Sandra Oliveira
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Administrative duties:

Sandra Oliveira's activity is to support the activities of the following research units: CFTP – Centre for Theoretical Particle Physics and CEFEMA – Center of Physics and Engineering of Advanced Materials.


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Administrative duties:

Sandra Martins works at the Department of Physics' secretariat. Since 2015, she has had responsibilities in the maintenance of the department's website and the television with updated information about the scientific, pedagogical and outreach activities. She participates in the organization of various department's initiatives such as the "Welcome week" for new students and the workshop "MEFT – Challenging the limits in science and technology" for high school students. She also provides support in the organization various of teaching activities and students examinations, and collaborated in the preparation of the present report.

