Luca Di Luzio

Curriculum Vitae

Educazione scientifica

26/09/2011 **PhD in Elementary Particle Theory**,
International School for Advanced Studies (ISAS/SISSA), Trieste, Italy,
Titolo della tesi: *Aspects of Symmetry Breaking in Grand Unified Theories,*
Relatore: Stefano Bertolini.

28/09/2007 **Laurea Specialistica in Fisica**, *Università di Roma "La Sapienza"*, Roma, Italy,
Titolo della tesi: *Pendenza e curvatura dei fattori di forma del decadimento $K_{\ell 3}$ nella QCD su reticolo*, Relatore: Guido Martinelli; Co-relatori: Gino Isidori, Federico Mescia.
Voto: 110/110 cum laude

05/10/2005 **Laurea Triennale in Fisica**, *Università dell'Aquila*, L'Aquila, Italy,
Titolo della tesi: *Relatività generale e manifestazioni fisiche della curvatura dello spazio*,
Relatore: Zurab Berezhiani.
Voto: 110/110 cum laude

Posizione lavorativa attuale

dal 15/11/2022 **Ricercatore a tempo indeterminato (III livello)**,
Istituto Nazionale di Fisica Nucleare, Sezione di Padova.

Posizioni lavorative precedenti

2021 – 2022 **Ricercatore universitario a tempo determinato (tipo A)**,
Dipartimento di Fisica e Astronomia, Università di Padova.

2019 – 2021 **Marie Skłodowska-Curie Fellow**, *DESY*, Hamburg (Germania),
Finanziato da un grant individuale H2020-MSCA-IF-2018 dell'Unione Europea.

2018 – 2019 **Assegnista di Ricerca**, *Dipartimento di Fisica, Università di Pisa*,
Finanziato da un grant ERC-AdG-2014 dell'Unione Europea (PI: Alessandro Strumia).

2016 – 2018 **Research Associate**, *IPPP, Durham University*, (Regno Unito),
Finanziato da un grant della "Science and Technology Facilities Council (STFC)".

2014 – 2016 **Assegnista di Ricerca**, *Dipartimento di Fisica, Università di Genova*,
Finanziato da un grant FP7-PEOPLE-2013-CIG dell'Unione Europea (PI: Carla Biggio).

2011 – 2014 **Research Fellow**, *Karlsruhe Institute of Technology*, Karlsruhe (Germania),
Finanziato da un grant della "Deutsche Forschungsgemeinschaft (DFG)".

Qualifiche professionali

14/04/2021 **Abilitazione scientifica nazionale per professore di I fascia**, *settore concorsuale 02/A2, fisica teorica delle interazioni fondamentali*, valida fino al 14/04/2032.

13/07/2018 **Abilitazione scientifica nazionale per professore di II fascia**, *settore concorsuale 02/A2, fisica teorica delle interazioni fondamentali*, valida fino al 13/07/2029.

Finanziamenti per progetti di ricerca

2023 **PRIN 2022 (PI)**, *INFN*, *Progetto di Rilevante Interesse Nazionale, finanziato dal MUR.* Acronimo: Axion-Origins. Codice: 2022K4B58X. Budget: 210 kEUR.

2022 **STARS Consolidator Grant (PI)**, *Università di Padova*, *Progetto di tipo ERC dell'Università di Padova, valutato da ex membri del panel ERC.* Acronimo: CPV-Axion. Programma STARS@UNIPD. Budget: 140 kEUR.

2022 **Marie Skłodowska-Curie Postoctoral Fellowship (Supervisore)**, *Università di Padova*, Acronimo: AxiTools. Programma HORIZON-MSCA-2021-PF-01. Codice: 101065579. Budget: 173 kEUR.

Borse di studio

2019 – 2021 **Marie Skłodowska-Curie Individual Fellowship**, *DESY*, Hamburg Acronimo: AXIONRUSH. Programma H2020-MSCA-IF-2018. Budget: 173 kEUR.

2007 – 2011 **SISSA PhD fellowship for graduate students**, *SISSA, Trieste*.

Premi e riconoscimenti

2020 **Performance bonus conferito dal Direttore del DESY**, *"in recognition of the special commitment to axion model building and phenomenology"*.

2020 **Physical Review Letters Editors' Suggestion**, *L'articolo* "Solar axions cannot explain the XENON1T excess", *by L. Di Luzio et al. [Phys. Rev. Lett. 125, 131804 (2020)]*, è stato selezionato "due to its particular importance, innovation, and broad appeal".

2017 **Physical Review Letters Editors' Suggestion**, *L'articolo* "Redefining the Axion Window", *by L. Di Luzio et al. [Phys. Rev. Lett. 118, 031801 (2017)]*, è stato selezionato "due to its particular importance, innovation, and broad appeal".

2017 **Outstanding contribution in reviewing**, *premio da parte della rivista Physics Letters B "in recognition of the contributions made to the quality of the journal"*.

Riassunto dell'attività scientifica

- 85 pubblicazioni di cui 60 su riviste "peer reviewed" (lista completa in Annex I): ***Physics Reports (1)***, ***Physical Review Letters (6)***, *Journal of High Energy Physics (22), Physical Review D (20), European Physics Journal C (4), Physics Letters B (3), Journal of Cosmology and Astroparticle physics (2), Reviews in Physics (1), Journal of Physics G (1).*
- Numero di citazioni: > 3700; h-index: 31 [iNSPIRE].
- 105 interventi come relatore presso conferenze/workshop e università/centri di ricerca, di cui 83 come "invited speaker" (lista completa degli interventi in Annex II).

Attività didattica

In totale, ho tenuto 3 corsi di dottorato, 2 corsi di laurea magistrale e 3 corsi di laurea triennale, oltre a lezioni di esercitazione per altri 6 corsi.

A.A. 2022/2023 **Advanced topics in the Theory of Fundamental Interactions** (24 ore), *Laurea magistrale in Fisica, Università di Padova*, docente del corso.

A.A. 2022/2023 **Fisica** (24 ore), *Scienze e Tecnologie per l'Ambiente, Università di Padova*, Laurea triennale, docente del corso.

2022 **Axions in Particle Physics** (8 ore), *Lezioni su invito per studenti di Master/Phd, Nankai University Physics School (China).*

A.A. 2021/2022 **4 Pieces on Axions** (24 ore), *Corso di Dottorato in Fisica, Università di Padova.*

A.A. 2021/2022 **Advanced topics in the Theory of Fundamental Interactions** (24 ore), *Laurea magistrale in Fisica, Università di Padova*, responsabile del corso.

A.A. 2021/2022 **Fisica** (24 ore), *Scienze e Tecnologie per l'Ambiente, Università di Padova*, Laurea triennale, docente del corso.

A.A. 2020/2021 **Fisica** (24 ore), *Scienze e Tecnologie Alimentari, Università di Padova*, Laurea triennale, docente del corso.

2018 **Axions and the strong CP problem**, *Durham University*, Corso di dottorato.

2018 **An introduction to the standard model of electroweak interactions**, *GGI Firenze*, Esercitatore per la scuola di PhD "GGI lectures on theory of fundamental interactions 2018".

2017/2018 **Foundations of Physics 1**, *Durham University*, Assistente del corso.

2016/2017 **Foundations of Physics 1**, *Durham University*, Assistente del corso.

2015/2016 **Fisica** (12 ore), *Scienze Ambientali e Naturali, Università di Genova*, Laurea triennale, assistente del corso.

2012/2013 **Computational Physics**, *Karlsruhe Institute of Technology, Germania*, Laurea specialistica, assistente del corso.

2011/2012 **Computational Physics**, *Karlsruhe Institute of Technology, Germania*, Laurea specialistica, assistente del corso.

Supervisione di postdoc e studenti

Attualmente sto supervisionando 3 ricercatori post-dottorato, 2 studenti di dottorato, uno studente di laurea magistrale ed uno di laurea triennale. Inoltre ho supevisionato 4 studenti di laurea magistrale, 2 studenti di laurea triennale.

Postdoc

01/2023 – in corso **Sebastian Hoof**, *Università di Padova (MSCA Fellow)*, Supervisore.

11/2022 – in corso **Philip Sørensen**, *Università di Padova (STARS Fellow)*, Supervisore.

11/2022 – in corso **Hector Gisbert Mullor**, *Università di Padova (STARS Fellow)*, Supervisore.

Dottorato

04/2022 – in corso **Xavier Ponce Díaz**, *Università di Padova*,
Co-relatore.

02/2021 – in corso **Claudio Toni**, *Sapienza, Università di Roma*,
Co-relatore.

Laurea magistrale

03/2023 – in corso **Enrico Scantamburlo**, *Università di Padova*,
Relatore. Titolo della tesi: *Probing light dark sectors via new macroscopic forces*.

07/2022 **Beatrice Munari**, *Università di Padova*,
Relatore. Titolo della tesi: *Flavour-violating signatures of non-universal axion models*.

09/2020 **Gioacchino Piazza**, *Sapienza, Università di Roma*,
Co-relatore. Titolo della tesi: *Next-to-Leading Order Axion-Pion Lagrangian and the Hot Dark Matter Bound*,
Vincitore del premio "Tito Maiani" dell'Accademia Nazionale dei Lincei per tesi di laurea riguardanti la Fisica.

09/2020 **Federica Devoto**, *Università di Genova*,
Relatore. Titolo della tesi: *Quantum tunnelling in field theory and its application to the Standard Model of electroweak interactions*,
Vincitrice del premio "Milla Baldo Ceolin" dell'INFN per le 10 migliori tesi di laurea magistrale nel campo della Fisica Teorica.

09/2016 **Simone Devoto**, *Università di Genova*,
Relatore. Titolo della tesi: *On the metastability of the Universe ground state in the standard model and its extensions*.

Laurea triennale

04/2023 – in corso **Matteo Verzeletti**, *Università di Padova*,
Relatore. Titolo della tesi: *Elettrodinamica dell'assione e principi di rilevamento degli assioni di materia oscura*.

09/2022 **Andrea Incrocci**, *Università di Padova*,
Relatore. Titolo della tesi: *Elettrodinamica dell'assione e principi di rilevamento degli assioni solari*.

12/2021 **Federico Testagrossa**, *Università di Padova*,
Relatore. Titolo della tesi: *Studio di potenziali non-relativistici per la fisica dell'assione*.

Attività istituzionali

27/09/2022 Membro di commissione della seduta di Laurea Triennale in Fisica, Università di Padova.

02/09/2022 Membro di commissione per la discussione di tesi di Dottorato in Fisica, Università di Padova.

06/2022 Membro della commissione esaminatrice di 2 concorsi per assegni di ricerca (prot. n. 1706 e 1707) presso il Dipartimento di Fisica e Astronomia dell'Università di Padova.

03/2022 Membro della commissione esaminatrice del concorso n. 23920/2021 dell'INFN per una borsa di studio per laureati presso la Sezione INFN di Padova.

17/12/2021 Membro di commissione della seduta di Laurea Triennale in Fisica, Università di Padova.

2021 - 2022 Membro del Consiglio di Corso di Laurea aggregato in Fisica, Università di Padova.

Attività organizzative

Organizzazione di eventi scientifici

2023 **Axions Across Boundaries between Particle Physics, Astrophysics, Cosmology and forefront Detection Technologies**
Training Week + Workshop + Conference. GGI Workshop 2023 program (Apr 24, 2023 – Jun 09, 2023).

2022 **Particle Avenues in the Dark Universe Arena (PADUA): Axions**
Sep 12 – 14, 2022, Padova.

2020 – 2021 **Newton 1665** (webinars on phenomenology/theory/astrophysics/cosmology).

2016 **IFAE2016**, *Università di Genova*, Convenor della sessione "Intensity Frontier".

2015 – 2016 **Particle Physics Phenomenology Seminars**, *Università di Genova*.

Partecipazione a gruppi di lavoro

2021 Membro del gruppo di lavoro "2021 Snowmass Summer Study", con contributi riassuntivi sulla fisica del "muon collider" e la fisica degli assioni.

2019 Membro del gruppo di lavoro "The landscape of QCD axion models", presso l'Aspen Center for Physics (Summer 2019) per la stesura di un Physics Reports sulla fisica degli assioni.

2019 Membro del gruppo di lavoro "Higgs Boson Potential at Colliders: Status and Perspectives", in collaborazione con l' "LHC Higgs Cross Section Working Group".

2018 Membro del gruppo di lavoro del CERN "Compact Linear Collider (CLIC) Physics Potential".

Attività di servizio

Divulgazione scientifica

05/2022 Intervento presso il Liceo Scientifico Ippolito Nievo di Padova, per una presentazione sulla fisica delle particelle.

2020 **Intervista su phys.org**, *Why solar axions cannot explain the observed XENON1T excess*.

2017 **Modelling the Invisible**, *Royal Society Summer Science Exhibition, London*,
Co-organizzatore per la Durham University.

2016 Organizzazione, coordinamento e direzione dell'attività "Formazione alla ricerca scientifica – PLS 2016, per lo stage di "Fisica Moderna" indirizzato a studenti delle scuole medie superiori presso il dipartimento di Fisica dell'Università di Genova.

2015 Organizzazione, coordinamento e direzione dell'attività "Formazione alla ricerca scientifica" – PLS 2015, per lo stage di "Fisica Teorica delle interazioni fondamentali" indirizzato a studenti delle scuole medie superiori presso il dipartimento di Fisica dell'Università di Genova.

Attività di valutazione e revisione

2023 **Valutatore di progetti di ricerca per la National Science Center (Polonia)**.

2022 **HORIZON-MSCA-PF-2022 Expert Reviewer**.

2021 **Revisore esterno per la VQR 2015-2019**.

2012 – in corso **Revisore per riviste scientifiche**, *European Physical Journal C, Physical Review D, Physical Review Letters, Physics Letters B, Journal of High Energy Physics, SciPost Physics*.

CV Martina Gerbino

PERSONAL INFORMATION

Family name, First name: Gerbino, Martina, ORCID: https://orcid.org/0000-0002-3538-1283, Webpage: https://www.fe.infn.it/cosmologia/index.php/martina-gerbino/?lang=en

CURRENT POSITION

2019 – date Researcher (Prima Ricercatrice), Istituto Nazionale di Fisica Nucleare (INFN), Ferrara Unit, Italy

PREVIOUS POSITIONS

2018 – 2019 Postdoctoral Appointee
High-Energy Physics Division, Argonne National Laboratory, USA

2015 – 2018 Postdoctoral Researcher
Oskar Klein Centre for Cosmoparticle Physics (OKC), Stockholm University, Sweden

EDUCATION

2012 – 2015 PhD in Physics, *Current and future constraints on fundamental physics in light of the results from Planck satellite*, defended in Jan 2016, classification: with honors
"Sapienza" University, Rome, Italy
PhD Supervisor: Prof. Alessandro Melchiorri

2010 – 2012 Master's degree in Astronomy and Astrophysics, mark: 110/110 cum laude
"Sapienza" University, Rome, Italy

2007 – 2010 Bachelor's degree in Physics, mark: 110/110 cum laude
"Sapienza" University, Rome, Italy

GRANTS, FELLOWSHIPS AND AWARDS

2023 ERC-Starting Grant "RELiCS – Revealing Elusive Light particles with Cosmic microwave background surveys across cosmological Scales", PI (1.5M€)

2023 FIS - Fondo Italiano per la Scienza 2021 "CMBNous - The definitive route to constrain neutrino properties from Cosmic Microwave Background experiments", PI, declined (1M€)

2023 PRIN, Progetti di Ricerca di Interesse Nazionale, "SHIFT – Statistically enHanced Investigation oF Tensions in cosmic microwave background data ", national PI (250k€)

2021 – date National scientific habilitation to full professor for the Astronomy and Astrophysics sector and to associate professor for the Theoretical Physics sector of the Italian academic system

2019 Official certificate in recognition of the "important contribution to the final results published by the Planck Collaboration" by Jan Tauber, Planck Project Scientist.

2018 – 2019 Associate Fellow (non-stipendiary), KICP, University of Chicago, USA

2018 Gruber Prize in Cosmology 2018 as a member of the Planck Team; Group Achievement Award (Royal Astronomical Society) as a member of the Planck Team

2016 Grant from Nordic Institute for Theoretical Physics - NORDITA for the organization of a month-long scientific program and a one-week conference (400k SEK)

2015 Best talk, Nordita Day, NORDITA, *A Tale of a Bright Guy: Listening to the CMB old story*

2014 Grant for junior researchers ("Avvio alla ricerca") from "Sapienza" University (2k€) to carry on research on "Neutrino physics in the era of precision cosmology" (PI)

2012 Corso di eccellenza (award for outstanding Master students), "Sapienza", Rome

2011 ISSNAF-INAF Fellowship (subsistence and ~400$/week for research) for a summer internship at NASA Goddard Space Flight Center, USA, supervisor: Dr. Neil Gehrels

2008 – 2010 Corso di eccellenza (award for outstanding Bachelor students), "Sapienza" University

2007 – 2012 Scholarship, Collegio Universitario "Lamaro-Pozzani", Rome

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Master Nicolò Elia Raffuzzi, co-supervisor, 2020 ("Impact of instrumental systematics on future Cosmic Microwave Background observations: half-wave plate non-idealities and the quest for V modes", defended), Ferrara University, Italy; Francesco Sorrenti, external supervisor, 2020-date (constraints on neutrino masses from the reconstruction of the large-scale matter power spectrum, in preparation), Perugia University, Italy

PhD Giorgia Zagatti, supervisor, 2022-date (physical modelling of extragalactic emissions); Luca Caloni, co-supervisor, 2019-2022 (astroparticle physics), Ferrara University; Serena Giardiello, supervisor, 2019-2022 (science performance of the LiteBIRD satellite), Ferrara University; Sunny Vagnozzi, mentor, 2015-2018 (constraining fundamental physics with cosmological data), Stockholm University

TEACHING ACTIVITIES

2020 – date "Neutrino Cosmology", lectures for the PhD program in Physics, Ferrara University

2019 – date Mentor of junior members (PhD students) of the Simons Observatory collaboration

2013 – 2014 Tutor, "Mathematics pre-courses" and "Mechanics and thermodynamics" (Bachelor, Mathematic Department, "Sapienza" University), "Mechanics" (Bachelor, Physics Department, "Sapienza" University)

ORGANISATION OF SCIENTIFIC MEETINGS

2023 "New frontiers in theoretical physics – XXXVII Convegno di Fisica Teorica", Cortona, Italy, SOC member

2022 LOC member, "From Planck to the future of CMB", Ferrara, Italy (conference); SOC member, "Simons Observatory Face-to-face 2022", San Diego, USA (collaboration meeting); Convener of the parallel session "Particle Physics in the Cosmos" of the NOW 2022 workshop, Ostuni, Italy

2021 Invited member of the TAUP 2021, TAUP 2023 International Advisory Committee

2021 CMB-S4 Spring Collaboration Meeting, LOC member (fully online event)

2019 "Next-generation Spectroscopy with LSST" workshop, Argonne National Laboratory, USA, SOC and LOC member

2017 "Advances in Theoretical Cosmology in Light of Data" program, Stockholm, Sweden, SOC and LOC member. Main scientific coordinator of the week "Messengers: Astroparticles and Gravitational Waves"; co-coordinator of the conference "Inflation and the CMB"

2017, 2019 Convener of the parallel session "Cosmology" of the "TeVPA 2017" conference, Columbus, USA and of the "TeVPA 2019" conference, Sydney, Australia

INSTITUTIONAL RESPONSIBILITIES

2022 – date Local coordinator (elected) of the INFN Theory group (CSN4) including budget management, Ferrara Unit

2022 – date Invited member of the Astrophysics Working Group, ASI (Italian Space Agency) Decadal Survey

2022, 2021 Member of the selection committees for INFN postdoc positions in Ferrara (2021) and Parma (2022)

2022 INFN Fubini award committee member; SISSA PhD admission committee member

2021 – date Faculty member, PhD program in Physics, Ferrara University

2020 Admission committee to the PhD program in Physics, Ferrara University

2019 – date Organiser of cosmology seminars, weekly journal clubs and cosmology group meetings, Ferrara University

2018 – 2019 Coordinator of the Cosmic Infrared Background working group, Organiser of HEP division and HEP Lunch seminars, Argonne National Laboratory

2015 – 2018 PhD student advisor, Stockholm University, Sweden

2016 – 2018 Organiser of weekly colloquia on behalf of the OKC colloquium committee, Convener of the Cosmology&Gravity working group, OKC, Stockholm University

REVIEWING ACTIVITIES

2016 – date Reviewer for PRD, PRL, JCAP, Annalen der Physik, Int.J.Mod.Phys.D

2017 – date Invited reviewer for NASA Experimental Program to Stimulate Competitive Research (EPSCoR); Invited panelist of NASA Astrophysics Data Analysis Program (ADAP) and NASA's ROSES/APRA Program, declined

MAJOR COLLABORATIONS

2013 – date Full member of the ESA's Planck collaboration. Core Team Member since 2016.

2016 – date Full member, member (elected) of the "Theory and Analysis Committee" since 2023, co-leader of the "Likelihood and Theory" Analysis Working Group since 2018, co-leader of the "Education and Public Engagement" committee in 2017-2021, member of the "Mentorship" committee of the Simons Observatory collaboration since 2021

2018 – date Full member of the CMB-S4 collaboration, chair of the Governing Board (elected member since 2020 for 2 terms) and of the Publication committee since 2018

2020 – date Full member of the LiteBIRD collaboration and of the Euclid consortium

VISITING

Mar-Sep 2020 Visiting scientist, by invitation of Prof. K. Heitmann, HEP Division, Argonne National Laboratory, canceled due to COVID-19 emergency

Feb-Jun 2016 Visiting postdoc, by invitation of Prof. K. Freese, University of Michigan

May-Jul 2015 Visiting PhD student, KICP, University of Chicago, advisor: Prof. E. Kolb

OUTREACH

2020 – date Coordinator of cosmology laboratories for high-school students, Ferrara University

2019 Selected as a speaker at the Soapbox science event at Chicago Navy Pier

2017 – date Co-leader of the "Education and Public Engagement" committee, Simons Observatory (SO) collaboration; content creator for the SO public website; SO social media organizer

2018 Organizer of outreach laboratories for high-school students during the European Researcher Nights in Stockholm (Forskarfredag and FysikFest)

2018 Interview for the video-documentary "The Eternal Sky" by the Simons Foundation

2012 Contributed author of S. Semplici, Editrice La Scuola, ISBN 9788835036234

Ramona Gröber

Curriculum Vitae

Università di Padova,
Dipartimento di Fisica e Astronomia "Galileo Galilei",
Via Marzolo 8,
35131 Padova, Italia

Professional career

Since Oct 22 **Associate Professor**,
Università di Padova, Padova, Italy.

Oct 19 – Sep 22 **Ricercatore a tempo determinato tipo B (corresponds to Assistant Professor with Tenure Track to Associate Professor)**,
Università di Padova, Padova, Italy.

Oct 18 – Sep 19 **W2 Professor (5 years fixed term)**,
Humboldt-Universität zu Berlin, Berlin, Germany.

Oct 16 – Sep 18 **Junior Research Fellow**,
Institute of Particle Physics Phenomenology, Durham University, Durham, United Kingdom.

Oct 14 – Sep 16 **Postdoctoral researcher**,
Istituto Nazionale di Fisica Nucleare (INFN), Sezione di Roma Tre, Rome, Italy.

May 14 – Sep 14 **Postdoctoral researcher**,
Karlsruhe Institute of Technology, Karlsruhe, Germany.

Education

Mar 11 – Apr 14 **PhD in Elementary Particle Theory**,
Karlsruhe Institute of Technology, Karlsruhe, Germany.
Thesis title: *"Aspects of Higgs physics and New Physics at the LHC"*,
Supervisor: Prof. Dr. Margarete Mühlleitner.

2011 **Diploma in Physics**,
Karlsruhe Institute of Technology, Karlsruhe, Germany.
Thesis title: *"Higgs pair production in the Composite Higgs Model"*,
Supervisor: Prof. Dr. Margarete Mühlleitner,
Grade: 1.0 (very good) with honors.

Career breaks

Dec 22 – Feb 23 **Paternity leave (64 days)**.

May 22 – Oct 22 **Maternity leave**.

Dec 19 – May 20 **Maternity leave**.

Research interests

- Higgs Physics
- Beyond the Standard Model phenomenology
- Higher order calculations (QCD and electroweak)
- Dark Matter at colliders

Summary of Research Activity

- 55 scientific papers, of which 37 published in peer-reviewed journals. See Annex.
- Bibliometrics: 2429 citations (published only), with h-index of 24 on the inspire-hep platform (date: 07/12/23).
- 62 talks, of which 19 invited talks at international conferences, 18 seminar talks at universities or research centers. See Annex.

Summary of Teaching Activity

- 32 courses either as responsible or teaching assistant on Bachelor, Master and PhD level. See Annex.
- Supervision of students: 4 PhD student, 4 Master students, 12 Bachelor students, 1 summer student.
- Several outreach activities (movies, science exhibitions, public talks). See Annex.

Grants and Awards

Since Sep 2023	Local Responsible of the Padua Unit of the PRIN2022 "MUS4GM2: Muon Scattering for G-2".
Oct 2022 – Jun 2023	Local Responsible of the Padua Unit of PRIN2017 "New Avenues in Strong Dynamics: from the Early Universe to the Lab".
Since Sep 2022	Participant to the grant "PNRR: CN1 - Spoke 2 National Centre for HPC, Big Data and Quantum Computing".
Sep 18	Durham Department of Physics Award for Excellence
Oct 16 – Sep 18	Marie Curie COFUND Fellowship at Durham University
Jun 11 – Dec 13	Grant of the "Landesgraduiertenförderung des Landes Baden-Württemberg"

Habilitation

Mar 2018	Habilitation in Theoretical Particle Physics (Associate Professorship level, valid until 03/2024), Italian Ministry for University and Research.

Comissions of Trust

Since Nov 2023	Member of the Management Committee of the COST Action COMETA.
Since 2023	External reviewer for the ERC, the Czech Republic Grant Agency and the Chilean National Agency for Research and Development (Fondecyt).
Aug-Sep 2023	Member of the hiring commission of an assistent professorship at the University of Milano Biccoca.
Since May 2022	Editorial Member of the Journal of Physics G.
Since 2022	Member of postdoc selection committees (2 INFN, 4 UniPD).
2022	Reviewer for SISSA PhD Entrance exam in Theoretical Physics, Trieste.
2019	Member of appointment commissions at the HU Berlin (1 tenure track in mathematical physics, 1 full professor in experimental high energy physics).
Since 2018	Member of five PhD commissions..
Since 2015	Peer reviewer for the following journals: Journal of High Energy Physics, Physical Review D, European Journal of Physics C, Nuclear Physics B, Journal of Physics G.

Other Scientific Activities

Since Nov 2023	Member of the Steering Committee of the LHC Higgs working group.
Since Sep 2023	WG1 (theory) convenor of the COST Action COMETA.
Nov 2022	Convenor of the Higgs pair session for the "Higgs 2022" conference, Pisa, Italy.
June 2022	Scientific organisation committee for the summer school "Invisibles 22" taking place from 13 to 17 June 2022 and the workshop "Invisibles 22" taking place from 20 – 24 June, 2022, both in Orsay, France.
May 2022	International organisation committee of the workshop "Higgs Pairs 2022" which will take place in Dubrovnik, Croatia from 30 May 2022 – 3 June 2022.
May 2018 – Nov 2023	Theory convenor of the WG4 (Multi-Higgs Production group) of the LHC Higgs Working group.
Sep 2019	Local Organiser of the Berlin QFT Master Class (summer school for master students) taking place from 2nd Sep – 6th Sep, 2019 at the HU Berlin.
Jul 2019	Convenor of the Higgs session of the Conference of the European Physical Society (EPS) of High Energy Physics 2019.
Oct 19	Editor of the section on "BSM Higgs resonant production" for the HH whitepaper "Higgs Boson Pair Production at Colliders: Status and Perspectives" [arXiv: 1910.00012] of the *"Double Higgs at Colliders"* workshop Sep 2018 at Fermilab, United States.
Sep 2018	Organisation of the theory talks for the workshop *"Double Higgs at Colliders"*, 4th Sep – 8th Sep, 2018, at Fermilab, United States.
May 2017	Local Organiser of the workshop *"Higgs Effective Theories (HEFT) 2017"*, 22nd May – 24th May, 2017, in Lumley Castle, Chester-Le-Street, UK.
Jan 16 – Sep 16	Organiser of the seminars of the theory group of INFN, Sezione di Roma Tre.

Ramona Gröber

Annex

Università di Padova,
Dipartimento di Fisica e Astronomia "Galileo Galilei",
Via Marzolo 8,
35131 Padova, Italia

Publications

[1] E. Bagnaschi, G. Degrassi and R. Gröber,
"Higgs boson pair production at NLO in the Powheg approach and the top quark mass uncertainties", Eur.Phys.J.C 83 (2023) 11, 1054, [arXiv:2309.10525].

[2] E. Balzani, R. Gröber and M. Vitti,
"Light-quark Yukawa couplings from off-shell Higgs production", JHEP10 (2023) 027, [arXiv:2304.09772].

[3] L. Alasfar, R. Gröber, C. Grojean, A. Paul and Z. Qian,
"Machine learning the trilinear and light-quark Yukawa couplings from Higgs pair kinematic shapes",
JHEP11 (2022) 045, [arXiv:2207.04157].

[4] G. Degrassi, R. Gröber, M. Vitti and X. Zhao,
"On the NLO QCD corrections to gluon-initiated ZH production", JHEP 08 (2022) 009, [arXiv:2205.02769].

[5] L. Di Luzio, R. Gröber and P. Paradisi,
"Higgs physics confronts the M_W anomaly', Phys.Lett.B 832 (2022) 137250, [arXiv: 2204.05284].

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[10] L. Alasfar, R. Corral Lopez and R. Gröber,
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"Top quark mass effects in $gg \to ZZ$ at two loops and off-shell Higgs interference", Phys. Rev. D100 (2019) 114013, [arXiv:1908.04061].

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[14] R. Bonciani, G. Degrassi, P. Giardino and R. Gröber,
"A Numerical Routine for the Crossed Vertex Diagram with a Massive-Particle Loop", Comput. Phys. Commun. 241 (2019) 122-131, [arXiv:1812.02698].

[15] L. Di Luzio, R. Gröber and G. Panico,
"Probing new electroweak states via precision measurements at the LHC and future colliders", JHEP 1901 (2019) 011, [arXiv:1810.10993].

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"Analytical Method for Next-to-Leading-Order QCD Corrections to Double-Higgs Production", Phys. Rev. Lett. 121 (2018) 16, 162003, [arXiv:1806.11564].

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"Searches for vector-like quarks at future colliders and implications for composite Higgs models with dark matter", JHEP 1803 (2018) 040, [arXiv:1801.06537].

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"Reconstruction of top-quark mass effects in Higgs Pair production and other gluon-fusion processes", JHEP 1803 (2018) 020, [arXiv:1709.07799].

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"Higgs Pair Production at NLO QCD for CP-violating Higgs Sectors", Nucl. Phys. B925 (2017) 1-27, [arXiv:1705.05314].

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[27] L. Di Luzio, R. Gröber, J. F. Kamenik and M. Nardecchia,
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"Light Stop Decays: Implications for LHC Searches",
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"NMSSMCALC: A Program Package for the Calculation of Loop-Corrected Higgs Boson Masses and Decay Widths in the (Complex) NMSSM",
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"Vector-like Bottom Quarks in Composite Higgs Models",
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"The measurement of the Higgs self-coupling at the LHC: theoretical status",
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"Higgs Boson Masses in the Complex NMSSM at One-Loop Level",
JHEP 1210 (2012) 122, [arXiv:1206.6806].

[35] R. Gröber and M. Mühlleitner,
"Composite Higgs Boson Pair Production at the LHC",
JHEP 1106 (2011) 020, [arXiv:1012.1562].

Working group publications

[36] P. Slavich and S. Heinemeyer (eds.),
"Higgs-mass predictions in the MSSM and beyond", Eur.Phys.J.C 81 (2021) 5, 450, [arXiv:2012.15629].

[37] B. Di Micco et al.,
"Higgs pair production at colliders: status and perspectives", Rev.Phys. 5 (2020) 100045 [arXiv:1910.00012]. Editor for the "New Physics in Higgs pair production" section.

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"Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector", [arXiv:1610.07922].

Proceedings

[40] J. Davies, R. Gröber, A. Maier, T. Rauh and M. Steinhauser,
"Padé approach to top-quark mass effects in gluon fusion amplitudes", PoS RADCOR2019 (2019) 079, [arXiv:1912.04097].

[41] L. Alasfar and R. Gröber,
"Probing light Yukawa couplings in Higgs pair production", [arXiv: 1910.04546].

[42] M. Chala, R. Gröber and M. Spannowsky,
"Interplay between collider searches for vector-like quarks and dark matter searches in composite Higgs models", Int. J. Mod. Phys. A34 (2019) 1940011.

[43] D. Barducci, H. Cai, T. Flacke, B. Fuks, R. Gröber, W. Porod and T. Rizzo,
"Exotic decays of heavy boson into SM quarks and vector-like quarks",
Les Houches 2017: Physics at TeV Colliders, New Physics Working Group Report, [arXiv:1803.10379].

[44] R. Gröber, O. Mattelaer and K. Mimasu,
"Comparing effective field theory operator bases numerically",
Les Houches 2017: Physics at TeV Colliders, New Physics Working Group Report, [arXiv:1803.10379].

[45] A. Carvalho, R. Gröber, S. Liebler and J. Quevillon,
"Interferences in searches for heavy Higgs bosons",
Les Houches 2017: Physics at TeV Colliders, New Physics Working Group Report, [arXiv:1803.10379].

[46] R. Gröber,
"Pair Production of Beyond the Standard Model Higgs Bosons",
[arXiv:1611.07391].

[47] R. Gröber,
"Light Stop Decays",
[arXiv:1509.04604].

[48] L. Di Luzio, R. Gröber, J. F. Kamenik and M. Nardecchia,
"Accidentally safe extensions of the Standard Model",
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[49] J. Baglio, T. N. Dao, R. Gröber, M. M. Mühlleitner, H. Rzehak, M. Spira, J. Streicher and K. Walz,
"NMSSMCALC - a Fortran Package for Higher Order Higgs Boson Masses and Higgs Decay Widths in the Real and the Complex NMSSM",
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"Higgs Pair Production in Composite Higgs Models at the ILC ",
Helmholtz Alliance Linear Collider Forum: Proceedings of the Workshops Hamburg, Munich, Hamburg 2010-2012, Germany

[51] J. Baglio, T. N. Dao, R. Gröber, M. M. Mühlleitner, H. Rzehak, M. Spira, J. Streicher and K. Walz,
"A new implementation of the NMSSM Higgs boson decays",
EPJ Web Conf. 49 (2013) 12001.

[52] R. Gröber and M. Mühlleitner,
"Higgs pair production in the composite Higgs model",
PoS CORFU 2011 (2011) 021.

PhD thesis

[53] R. Gröber,
"Aspects of Higgs Physics and New Physics at the LHC",
Karlsruhe Institute of Technology, 2014.

Preprints

[54] L. Alasfar, L. Cadamuro, C. Dimitriadi, A. Ferrari, R. Gröber, G. Heinrich, T. Ingebretsen Carlson, J. Lang, S. Ördek, L. Pereira Sanchez, L. Scyboz, and J. Sjölin, *"Effective Field Theory descriptions of Higgs boson pair production"*, [arXiv: 2304.01968].

[55] S. Di Noi, R. Gröber, G. Heinrich, J. Lang and M. Vitti, *"On γ_5 schemes and the interplay of SMEFT operators in the Higgs-gluon coupling"*, [arXiv:2310.18221]

Talks

Apr 2023 *"Probing light Yukawa couplings at the (HL-)LHC"*, (invited)
Portoroz 2023, Portoroz, Solvenia.

Nov 2022 *"Quo vadis, Higgs Boson?"*, (invited)
26th Conference of Women in Physics, Karlsruhe, Germany.

Nov 2021 *"Di-Higgs production in effective field theory"*, (invited),
ATLAS HH workshop, online.

June 2021 *"HH production in a global fit"*, (invited),
Large Hadron Collider Physics conference (LHCp) 2021, online conference.

June 2021 *"BSM effects in di-Higgs production"*, (invited),
Weak interactions and Neutrinos 21, online conference.

June 2021 *"Di-Higgs production in effective field theory"*, (invited),
seminar for the CMS Higgs group.

Jan 2021 *"CP-violating ALP"*, (invited),
BSM seminar at Karlsruhe Institute of Technology, online.

Nov 2020 *"Summary and future plans of the HH cross group"*,
General assembly of the LHC Higgs working group, online.

Aug 2020 *"Probing light Yukawa couplings in Higgs Pair Production"*,
Snowmass BSM Higgs group meeting, online.

Nov 2019 *"Top quark mass effects in $gg \to ZZ$ at two loops and off-shell Higgs interference"*,
HXSWG Offshell and Interference Meeting, CERN, via vidyo.

Apr 2019 *"Quo vadis, Higgs?"*,
Antrittsvorlesung, Humboldt-University Berlin, Germany.

Mar 2019 *"Back to the future: the Higgs boson"*, (invited),
Seminar talk, University of Padova, Italy.

Jan 2019 *"Probing the Higgs Boson in pairs"*, (invited),
Seminar talk, University of Heidelberg, Germany.

Jan 2019 *"Top quark mass effects in gluon fusion processes"*, (invited),
Seminar talk, Milan, Italy.

Dec 2018 *"Future probes of the Higgs Boson"*, (invited),
7th Rome Joint Workshop, Frascati, Italy.

Dec 2018	*"HH theory"*, LHC Higgs cross section working group general assembly, CERN, Geneva, Switzerland.
Dec 2018	*"Probing the Higgs Boson in pairs"*, (invited), Seminar talk, Madrid, Spain.
Oct 2018	*"Top quark mass effects in gluon fusion processes"*, (invited), Seminar talk, Karlsruhe, Germany.
Sep 2018	*"Composite Higgs Models and how to probe them"*, (invited), HDays'18, Santander, Spain.
Sep 2018	*"SM and BSM Higgs properties"*, (invited), Invisibles Workshop, Karlsruhe, Germany.
June 2018	*"Dark Matter in Composite Higgs Models"*, MITP workshop, "The Future of BSM Physics", Capri, Italy.
May 2018	*"Higgs pair production as a window to new physics"*, (invited), DESY, Hamburg, Germany.
Apr 2018	*"Composite Higgs Models"*, (invited), MC4BSM Workshop, Durham, UK.
Mar 2018	*"About Dark Matter scenarios in Composite Higgs Models and how to probe them"*, (invited), Seminar talk, LNF, Frascati, Italy.
Mar 2018	*"Top quark mass effects in gluon fusion processes"*, (invited), Seminar talk, Max Planck Institute, Munich, Germany.
Mar 2018	*"Future probes of the (beyond the) Standard Model Higgs boson"*, (invited), 82nd Meeting of the German Physics Society (DPG), Würzburg, Germany.
Dec 2017	*"Mazi-sizing the trilinear Higgs self-coupling"*, (invited), IRN Terascale meeting, Marseille, France.
Nov 2017	*"The future of BSM Higgs phenomenology"*, (invited), Discussion session, "Out of the Higgs era into the dark", Durham, UK.
Nov 2017	*"Composite Higgs Models"*, (invited), Higgs couplings, Heidelberg, Germany.
Nov 2017	*"On Higgs pair production and the trilinear Higgs self-coupling"*, (invited), Seminar talk, NIKHEF, Amsterdam, Netherlands.
Sep 2017	*"Higgs pair production and the trilinear Higgs self-coupling"*, HDays'17, Santander, Spain.
May 2017	*"Higgspaarproduktion als Fenster zu Neuer Physik"*, (in German, invited), Seminar talk, Humboldt Universität zu Berlin, Berlin, Germany.
Apr 2017	*"Higgs pair production and the trilinear Higgs self-coupling"* , (invited), Seminar talk, SISSA, Trieste, Italy.
Apr 2017	*"On the Higgs self-coupling modifications"*, (invited), Portoroz 2017, Portoroz, Slovenia.
Mar 2017	*"New Physics Deviations in Higgs Pair Production at the LHC"*, 3rd Toyama International Workshop on "Higgs as a Probe of New Physics", Toyama, Japan.
Nov 2016	*"Pair Production of Beyond the Standard Model Higgs Bosons"*, Seminar, IPPP, University of Durham, Durham, UK.
July 2016	*"Pair Production of Beyond the Standard Model Higgs Bosons"*, (invited), 5th International Conference New Frontiers in Physics, Kolymbari, Crete, Greece.

May 2016	*"Higgs Pair Production in Standard Model Extensions"*, (invited) Seminar talk at the Brookhaven National Laboratory, Brookhaven, United States.
May 2016	*"New Physics in Higgs Pair Production"*, Phenomenology 2016, Symposium, Pittsburgh, United States
Oct 2015	*"Beyond the Standard Model Higgs pair production"*, (invited), HEPKIT workshop, Karlsruhe Institute of Technology, Karlsruhe, Germany.
June 2015	*"NMSSMCALC"*, (invited), Meeting of the WG3 subgroup of the LHC Higgs cross section WG, via video.
June 2015	*"Light stop decays"*, (invited), 27th Rencontres de Blois, Blois, France.
Apr 2015	*"Higgs pair production in strongly-interacting models"*, Workshop on Higgs pair production, MITP, Mainz, Germany.
Apr 2015	*"Accidental matter at the LHC"*, (invited), Portoroz 2015, Portoroz, Slovenia.
Apr 2015	*"Higgs pair production in the Standard Model and beyond"*, Seminar at the University Roma Tre, Italy.
Feb 2015	*"Higgs pair production in the Standard Model and beyond"*, (invited), Seminar at the University of Genoa, Italy.
Oct 2014	*"Light stop decays"*, (invited), Internal ATLAS meeting, via video.
Sep 2014	*"Vector-like bottom quarks in Composite Higgs Models"*, (invited), Workshop on vector-like quarks, DESY, Hamburg, Germany.
May 2014	*"Light stop decays"*, Planck 2014, Paris, France.
Jan 2014	*"Vector-like fermions in Composite Higgs models"*, (invited), Seminar at the DAMTP, Cambridge, UK.
Dec 2013	*"Higgs boson(s) in the Standard Model and beyond"*, (invited), Seminar at the University of Würzburg, Germany.
Oct 2013	*"Vector-like fermions in Composite Higgs models"*, (invited), Seminar at the Paul-Scherrer-Institute (PSI), Villigen, Switzerland.
Oct 2013	*"Vector-like fermions in Composite Higgs models"*, Workshop of GRK/KCETA 2013, Bad Liebenzell, Germany.
Aug 2013	*"Vector-like bottom partners in Composite Higgs models"*, SUSY 2013, Trieste, Italy.
Mar 2013	*"Theoretical status of the measurement of the Higgs self-coupling"*, 77th Meeting of the German Physics Society (DPG), Dresden, Germany.
Dec 2012	*"The low-energy theorem in Composite Higgs models"*, 6th Annual Workshop of the Helmholtz Alliance, DESY, Hamburg, Germany.
Oct 2012	*"Single and Double Higgs production in Composite Higgs models with heavy top-partners"*, 18th meeting of the SFB/TR9, Berlin, Germany.
Sep 2012	*"Higgs-Paar-Production in Composite Higgs Modellen"*, (in German), 44th Herbstschule für Hochenergiephysik, Maria Laach, Germany.

Feb 2012 *"Higgs pair production in Composite Higgs models and the effects of heavy top partners"*,
76th Meeting of the German Physics Society (DPG), Göttingen, Germany.

Feb 2012 *"Higgs pair production in Composite Higgs models"*,
3rd LC-Forum, DESY, Hamburg, Germany.

Sep 2011 *"Higgs pair production in the Composite Higgs model"*,
1st Summer School of ITN: Unification in the LHC Era, Corfu, Greece.

Jul 2011 *"Higgs pair production in the Composite Higgs model"*, (invited),
Higgs Hunting Workshop 2011, Orsay, France.

Jul 2011 *"Higgs self-couplings in the Composite Higgs model"*,
2nd LC-Forum, Munich, Germany.

Mar 2011 *"Higgs pair production in the Composite Higgs model"*,
75th Meeting of the German Physics Society (DPG), Karlsruhe, Germany.

Teaching

Oct 23– Dec 23 Elements of Physics 2 (Electrodynmaics) for Engineers as responsible at the University of Padova. 54 acdemic hours of lecture, 14 hours of laboratory.

Jul 2023 PhD course on effective field theories at the University of Padova. 8 academic hours.

Mar 23 – Jun 23 Campi Elettromagnetici (Classical Field theory) as responsible at the University of Padova. Course of 48 academic hours.

Apr 2022 PhD course on effective field theories at the University of Padova. 8 academic hours.

Oct 21 – Jan 22 Campi Elettromagnetici (Classical Field theory) as responsible at the University of Padova. Course of 48 academic hours.

Oct 21 – Jan 22 Istituzioni di Fisica Teorica (exercise part of 32 hours of the third year quantum mechanics course) at the University of Padova.

June 21 PhD course (part of 8 academic hours) on "Effective Field theories for particle physics" at the University of Padova.

Oct 20 – Jan 21 Campi Elettromagnetici (Classical Field theory) as responsibile at the University of Padova. Course of 48 academic hours.

Oct 20 – Dec 20 Istituzioni di Fisica Teorica (exercise part of 16 academic hours of the third year quantum mechanics course) at the University of Padova.

Oct 19 – Dec 19 Istituzioni di Fisica Teorica (exercise part of 16 academic hours of the third year quantum mechanics course) at the University of Padova.

Sep 19 Lecture on "Electroweak Symmetry Breaking" at the Berlin QFT Master Class (summer school on quantum field theory for Master students), 2/9/19-6/9/19 at the HU Berlin.

Apr 19 – Jul 19 Seminar on Higgs Physics at the HU Berlin.

Apr 19 – Jun 19 Lecture and Exercises on Basics of Mathematics (for first semester students) at HU Berlin.

Oct 18 – Feb 19 Tutorial on Mathematics and Physics for 1st semester students (in the framework of equal opportunity measures) at HU Berlin.

Oct 18 – Feb 19	Seminar on Particle Physics for Bachelor students "Licht ins Dunkle des Universums" at HU Berlin.
May 18	Lecture for MSc and PhD students on "Beyond the Standard Model Higgs" at Durham University.
academic year 17/18	Tutorials on the Level 1 course "Foundations of Physics" at Durham University.
May 17	Lecture for MSc and PhD students on "Higgs physics in the Standard Model and beyond" at Durham University.
Apr 14 – Sep 14	Teaching assistant for Experimental Nuclear and Particle Physics, KIT, Karlsruhe.
Apr 13 – Sep 13	Teaching assistant for Experimental Nuclear and Particle Physics, KIT, Karlsruhe.
Oct 12 – Mar 13	Teaching assistant for Experimental Solid State Physics, KIT, Karlsruhe.
Apr 12 – Sep 12	Teaching assistant for Analytical Mechanics, KIT, Karlsruhe.
Oct 11 – Mar 12	Teaching assistant for Advanced Quantum Mechanics, KIT, Karlsruhe.
Apr 11 – Sep 11	Teaching assistant for Quantum Mechanics, KIT, Karlsruhe.
Oct 10 – Mar 11	Teaching assistant for Electrodynamics and Quantum Mechanics for Teachers, KIT, Karlsruhe.
Apr 10 – Sep 10	Teaching assistant for Quantum Mechanics, KIT, Karlsruhe.
Apr 09 – Sep 09	Teaching assistant for Analytical Mechanics, KIT, Karlsruhe.
Apr 09 – Jul 09	Laboratory assistant for measurement and control systems, KIT, Karlsruhe.
Oct 08 – Mar 09	Teaching assistant for Electrodynamics, KIT, Karlsruhe.
Apr 08 – Sep 08	Teaching assistant for Analytical Mechanics, KIT, Karlsruhe.
Oct 07 – Mar 08	Teaching assistant for Classical Mechanics, KIT, Karlsruhe.
Sep 07	Laboratory assistant for Material Science, KIT, Karlsruhe.

Outreach

Apr 2019	Outreach talk at the physical society of high school students at HU Berlin on Higgs Physics. Title: "Das Higgs-Boson: woher bekommen Teilchen ihre Masse?" (talk in German).
June 2018	Participation to the Pre-application day at Durham University, UK, presenting the Institute of Particle Physics Phenomenology and the *"Modelling the Invisible"* exhibit prepared for the Royal Society Exhibition in London (July 2017).
Oct 2017	Participation to the "Celebrate Science" Exhibition in Durham, UK, with *"Modelling the Invisible"* prepared for the Royal Society Exhibition in London (July 2017).
July 2017	Participation to the Royal Society Summer Exhibition in London, UK, with *"Modelling the Invisible"*. In the framework of the exhibition, preparation of outreach material (e.g. movie `https://www.youtube.com/watch?v=TxSUw38a4Vg&t=24s` and information material).
Oct 10 – Dec 11	Public science project *"Inside Science"* in collaboration with the Centre of Cultural and General studies and the Public Relations and Marketing department of the KIT. Video portal and more information are available at `http://inside-science.forschung.kit.edu`.

Federico Mescia

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Summary

My main scientific activity is phenomenology of weak and strong interactions in the Standard Model (SM) and beyond. I have mainly explored the weak decays of hadrons with a goal of selecting observables that allow a high precision theoretical predictions that could be experimentally tested in order to discover the effects of New Physics (NP) (such as extra sources of CP violation with respect to the SM). High precision tests of loop induced processes in the SM (such as $(g-2)_\mu$, $b \to s\ell^+\ell^-$ modes, Kaon decays and many others) offer a window to discovering the presence of new particles propagating in the loops, in a way similar to how charm and/or top quarks have been discovered.

Moreover, from 2015, I have extended my interests to the phenomenology of axion physics and more general dark sectors, which can play an important role in near future. I have made important theoretical studies to constraint the coupling of axion with photons, nucleons and electrons in view of new experiments, like IAXO. This research has been published in several PRLs and 2/3 of them have been awarded as editor suggestion. Axions by itself is a very good candidate as dark matter. Recently, I have also enriched my expertise about the study of NP models with stable weak interacting massive particles (WIMPS) as dark matter candidate. Here, I have linked dark sectors to flavor physics, namely dark particles can enter in loop of flavor observable.

My main field of expertise is the treatment of strong interaction effects in hadron decays (strong and/or weak), by using both analytic methods (such as effective theories of HQET and ChPT), and numerical simulations related to the formulation of QCD on the lattice. In addition to QCD, I also extended my expertise to the phenomenology of NP models. Recently, I have studied NP models based on vertor-like fermions and leptoquarks for $b \to s\ell^+\ell^-$ processes which exhibits at LHCb several discrepancies with respect to the SM.

I have also worked on projects of large scale QCD simulations, which includes the use of large computing resources in Europe, as Mare Nostrum in Barcelona.

Finally, I have directed a number of PhD students and postdocs and have been PI and Co-PI of several grants.

Keywords:

Effective Theories in the SM and beyond, Flavor Physics, Lattice QCD, B and Kaon Physics, Axion, Dark Matter.

Citation Summary:

5300 Citations from Inspire (7236 - Google Scholar, & 3800 - Thomson Reuters ISI).
h-index: 41 (Inspire), 46(Google Scholar), 36 (Thomson Reuters, ISI).
64 Peer-Reviewed papers. Top Cited Papers (+150): 20.

Invited Contributions and Stays:

25 plenary talks (9 reviews) & 2 conference round tables.
Invited stays at Annecy, Frascati (LNF), Florence (GGI), Mainz (MITP), Munich (MIAPP), Orsay, Benasque and CERN TH institute.

Selected Review Talks:

Explaining B-anomalies, *LHCb and Belle II Opportunities for Model Builders* , Feb. '19, Mainz (Germany).
Recent Results on Flavor Physics, *XIth Quark Confinement*, Set. '14, S. Petersburg (Russia).
Review of Flavor Physics, *Frontiers of Fundamental Physics '14*, July '14, Marseilles (France).
Theory Review in the SM, *Kaon13*, April '13, Ann Arbor (USA).
Lattice QCD and New Flavor Physics, *Recontres de Moriond 2010*, March '10, La Thuille (Italy).

Research Achievements:

(2020) - "Solar axions cannot explain the XENON1T excess," PRL and editor suggestion **Cited: 80**;
(2020) - "$g-2$ and B-anomalies explanations," PRL and editor suggestion **Cited: 33**;
(2017) - First model for an astrophobic Axion. PRL **Cited: 80**.
(2016) - Redefining the Axion Window, according to theoretical criterium. PRL and editor suggestion **Cited: 132**.
(2013) - First complete calculation of $W_L W_L$ scattering at one-loop order in composite Higgs model. **Cited: 100**.
(2012) - First complete definition of the $B \to K^* \mu\mu$ theoretically clean observables. **Cited: 350**.
(2007-10) - Reduction of the theoretical uncertainties for $Br(K \to \pi\nu\nu)$ by a factor 7, using the isospin breaking corrections at NLO in ChPT and new experimental data in $K \to \pi\ell\nu$. **Cited: 200**.

(2006) - First calculation of light loops in $K \to \pi\nu\nu$. Here we completed and amended the effective chiral Lagrangian approach to the problem. **Cited: 200**.
(2005) - First calculation of $K \to \pi\ell\nu$ form factor $f_+(0)$ on the lattice and **(2005-10)** phenomenological studies to assess CKM unitarity relation: **Cited: 600**.
(2002) - First calculation at NLO of spectator effects entering the lifetimes of Beauty hadrons and the CP-violating parameters on the B_d system. Recent experimental results from LHCb and B-Factories confirm our theoretical predictions. **Cited: 300**.

Grants:

2 as PI, 4 as Co-PI & 10 as team member.

Conference Organization:

6 as convener of conference session & 5 as member of local organizing committee.

Working Collaborations:

IAXO collaboration; European Twisted Mass Collaboration (ETMC) for Lattice QCD; Kaon Working Group for Kaon Physics.

Academic/Administration Responsibilities:

Physics Faculty Council (2015-2023) (Url); "Claustre" of University of Barcelona (2013-18, 2022-27) (Url); Scientific secretary of ICCUB (since 2015) (Url); Council of Department of Quantum Physics and Astrophysics (FQA) (since 2015) (Url); CPAN - Consejo de Estrategia Científica (2018-22) (Url); Commission of the Master program in Astrophysics, Particle Physics and Cosmology, Universitat de Barcelona (Url); Coordinator of the teaching activities of the Theory group at UB (Url); Teaching coordinator for under- and post-graduate courses (Url1, Url2)

Outreach activities:

Salad of six Flavors with sauce of Higgs, University Open days to promote postgraduate activities of Physics Faculty at University of Barcelona.

Student Supervision Activities:

5 Ph.D Thesis as advisor; 8 Master Thesis.

Education:

University of Rome, "La Sapienza" — Rome, Italy

Ph.D Degree in Theoretical Physics — *2001*
focused on B physics and perturbative calculations.

Degree in Theoretical Physics — *1998*
focused on numerical simulations of QCD on the lattice.

Experience:

University of Barcelona — Barcelona

Full Professor — *Feb. '19 - current*

Associate Professor — *Dec. '14 - Jan. '19*
"Serra-Húnter" national funding scheme to stabilize research talent.

Fixed-term Researcher (Ramon y Cajal) — *March '09 - Nov. '14*
"Ramon y Cajal" tenure-track national funding scheme.

INFN — LNF, Frascati, Italy

Fixed-term Researcher — *Dec. '05 - Feb. '09*

University of Southampton — Southampton, England

Postdoc — *Oct. '01 - Dec. '05*

Recent Publications:

- G. Arcadi, L. Calibbi, M. Fedele and F. Mescia, "Muon $g-2$ and B-anomalies from Dark Matter," **Phys. Rev. Lett. 127** (2021) no.6, 061802, [arXiv:2104.03228 [hep-ph]].
- P. Arnan, A. Crivellin, M. Fedele and F. Mescia, "Generic loop effects of new scalars and fermions in $b \to s\ell^+\ell^-$," JHEP **1906**, 118 (2019).
- P. Arnan, D. Becirevic, F. Mescia and O. Sumensari, "Probing low energy scalar leptoquarks by the leptonic W and Z couplings," JHEP **1902**, 109 (2019).
- L. Di Luzio, F. Mescia, E. Nardi, P. Panci and R. Ziegler, "Astrophobic Axions," Phys. Rev. Lett. **120**, no. 26, 261803 (2018).
- L. Di Luzio, F. Mescia and E. Nardi, "Redefining the Axion Window," Phys. Rev. Lett. **118**, no. 3, 031801 (2017).

Referees:

- **Prof. Domènec Espriu** (U. Barcelona), `espriu@icc.ub.edu`, phone: +34 934 035 512.
- **Prof. Gino Isidori** (U. Zurich), `isidori@physik.uzh.ch`, phone: +41 44 635 5751.
- **Dr. Damir Becirevic** (Orsay),`Damir.Becirevic@th.u-psud.fr`, phone: +33 1 6915 7663.
- **Prof. Vittorio Lubicz**, (Roma Tre), `lubicz@fis.uniroma3.it`, phone: +39 06 5733 7307.
- **Prof. Jonathan Flynn**, (Southampton), `jflynn@phys.soton.ac.uk`, phone: +44 23 8059 2081.
- **Prof. Guido Martinelli**, (Sapienza), `guido.martinelli@roma1.infn.it`, phone: +39 06 4991 4234.

Research Grants

- Title: **ICCUB: Maria de Maetzu**
  Funding Body: Spanish Ministery of Education.
  Period: April 2020 -2023. PI: Jordi Miralda. Co-Pi: F.Mescia, D. Mateos, E. Graugés, L. Verde: 2M €.
- Title: **Teoría y fenomenologiá de las interacciones fundamentales: fisica de particulas y unificacion de las fuerzas**
  Funding Body: Spanish Ministery of Education.
  Period: December 2019 -2021. PI: Concepcion Gonzalez and F. Mescia. Amount: 300k €.
- Title: **Teoría y fenomenologiá de las interacciones fundamentales: fisica de particulas y unificacion de las fuerzas**
  Funding Body: Spanish Ministery of Education.
  Period: April 2016 -2019. PI: Concepcion Gonzalez and D. Espriu . Amount: 300k €.
- Title: **Teoría y fenomenologiá de las interacciones fundamentales: fisica de particulas y unificacion de las fuerzas**
  Funding Body: Spanish Ministery of Education.
  Period: April 2013 -2016. PI: D. Espriu and F. Mescia. Amount: 300k €.
- Title: **Grup consolidat de Física Teòrica d'Altes Energies**
  Funding Body: Agència de Gestió d'Ajuts Universitaris i de Recerca. Generalitat de Catalunya.
  Period: April 2017 -2020. PI: Jorge Russo: 50k €.
- Title: **ICCUB: Maria de Maetzu**
  Funding Body: Spanish Ministery of Education.
  Period: April 2015 -2019. PI: Josep M. Paredes: 2M €.
- Title: **Participación Española en Estructuras Europeas de Investigación en Física de Partículas, Astropartículas y Nuclear (CPAN)**
  Funding Body: Spanish Ministery of Education.
  Period: April 2019 -2021. PI: Antonio Pich: 60k €.
- Title: **Red Española de Física de Sabor (REFIS)**
  Funding Body: Spanish Ministery of Education.
  Period: April 2017 -2019. PI: Maria Aranzżu Oyanguren: 20k €.

- Title: **De la evidencia al descubrimiento de nueva Física en LHC**
  Funding Body: Spanish Ministery of Education.
  Period: April 2015 -2017. PI: Joaquim Matias: 60k €.

- Title: **Grup consolidat de Física Teòrica d'Altes Energies**
  Funding Body: Agència de Gestió d'Ajuts Universitaris i de Recerca. Generalitat de Catalunya.
  Period: April 2009 -2013. PI: Joan Solà: 50k €.

- Title: **Funding to organize the conference "International Meeting on Fundamental Physics" (IMFP14)**.
  Funding Body: CPAN, Spanish Flavor Networks and University of Barcelona.
  Period: February 2014. PI: F. Mescia.

- Title: **Flavor Physics in the Standard Model and Beyond**
  Funding Body: Ramón y Cajal Program, Spanish Ministry of Education.
  Period: from 2009 to 2014. PI: F. Mescia.

- Title: **I3 Program for Excellence in Research Activity**
  Funding Body: Spanish Ministry of Education.
  Period: April 2013 -2014. PI: F. Mescia. Amount: 100k €.

- Title: **Teoría y fenomenología de las interacciones fundamentales: Física de partículas y la unificación de las fuerzas**
  Funding Body: Spanish Ministery of Education.
  Period: April 2011 -2013. PI: D. Espriu.

- Title: **Kaon Physics on the lattice with up, down, strange and charm dynamical quarks**
  Funding Body: Supercomputing Center Mare Nostrum.
  Period: from 2010 to 2012. PI: F. Mescia. Amount 3000k hrs.

- Title: **QCD Form Factors on the Lattice**
  Funding Body: ECT$*$ Trento, Ben-Aurora cluster.
  Period: from 2007 to 2008. PI: F. Mescia.

- Title: **Teoría y fenomenología de las interacciones fundamentales**
  Funding Body: Spanish Ministery of Education.
  Period: April 2007 -2010. PI: D. Espriu.

- Title: **QCD Simulations for Flavor Physics in the Standard Model and Beyond**
  Funding Body: PRACE, Center Jülich, Germany.
  Period: from 2011 to 2012. PI: V. Lubicz.

Professional Activities

- Member of the CPAN-CEC (CPAN - Consejo de Estrategia Científica) 2018-2022.

- Organizing Committee member, "International Meeting on Fundamental Physics (IMFP14)" (*http://benasque.org/*, February 3rd -7th 2014 Benasque).

- Organizer of Theory-Group Xmas meeting at University of Barcelona since 2011, (*http://www.ecm.ub.es/ mescia/2011*, Barcelona 21 - 22 December 2011, *http://www.ecm.ub.es/ mescia/2012*, Barcelona 19 - 20 December 2012, *http://www.ecm.ub.es/ mescia/2013*, Barcelona 18 - 19 December 2013, *http://icc.ub.edu/webs/ICCUB_Christmas_Meeting/*, Barcelona 18 - 19 December 2014.).

- Convener of Super B general meeting, (*http://www.cabibbolab.it/index.php/en/science/superb-physics*).

- Convener of the worskshop "CKM 2010", (*http://ckm2010.warwick.ac.uk*, Warwick 6 - 10 Settembre 2010).

- Convener of the worskshop "NA62 Physics Handbook", (*http://na62pb.ph.tum.de/*, CERN 10 - 11 Dicembre 2009).

- Convener and Summary Speaker of "Flavor Physics" Parallel session, "Annual meeting on High energy physics" (*IFAE 07*) (*http://ifae2007.na.infn.it/*), Naples April 11 - 13 2007, Italy.

- Member of the FlaviaNet Kaon Working Group (*http://www.lnf.infn.it/wg/vus/*).

- Editorial Board Member, *KAON 07* (*http://pos.sissa.it/Kaon07*), Frascati May, 21 - 25 2007.
- Organizing Committee member, "LNF Spring School on Particle Physics": since 2005 (*http://www.lnf.infn.it/conference/lnfss/07/*).

Student Supervisor Activities

- Ph.D. Thesis, student Inigo Asiain, University of Barcelona, March 2019 - current.
- Ph.D. Thesis, student Pere Arnan, University of Barcelona, defense September 2020. Final mark excellent cum laude.
- Ph.D. Thesis, Dr. Albert Renau, in collaboration with Prof. D. Espriu, University of Barcelona, defense November 2015. Final mark excellent cum laude.
- Ph.D. Thesis, Dr. Cecilia Tarantino, in collaboration with Prof. V. Lubicz, University of Roma Tre, defense February 2006. Final mark excellent cum laude.
- Ph.D. Thesis, Dr. Abdullah Shams Tariq, in collaboration with Prof. J. Flynn, University of Southampton (UK), defense June 2004. Final mark excellent cum laude.
- Master Thesis, student David Cabo Almeida, University of Barcelona, November 2020 - June 2021.
- Master Thesis, student Daniele Lombardi, University of Bologna/Barcelona, November 2017 - June 2018.
- Master Thesis, student Clara Hormigos, University of Barcelona, November 2015 - June 2016.
- Master Thesis, student Daniel Moreno, University of Barcelona, November 2013 - June 2014.
- Master Thesis, student Adrià Gómez Valent, University of Barcelona, November 2012 - June 2013.
- Master Thesis, student Maria Jorba, University of Barcelona, November 2013 - June 2014.
- Master Thesis, student Albert Renau, University of Barcelona, June 2009 - June 2010.
- Master Thesis, student Rebeca Canedo Abad, University of Barcelona, January 2010 - September 2010.
- Final year Thesis (Tesi di Laurea), student Luca Di Luzio, University of Rome "La Sapienza", January - September 2007.

Teaching Experience

- About 3000 hours teaching from 2009: lectures and problem classes at under- and post-graduate level.

  I have always been committed to active teaching at the UB. Students must be the central part of the learning process to which the teacher is a facilitator. I believe that one learns better and faster when seeking knowledge needed to solve problems and by solving the actual problems. The realistic examples derived from my research experience to formulate problems are both a source of motivation to always improve my teaching and adapt it to a given class of students.

  Since 2009, I have been teaching University courses at the master and at two under-graduate degrees of the Faculty of Physics at UB. The subjects at the bachelor's degree are generic the master's are more closely linked to the group's research.

- from 2020/21 to current:
  -Undergraduate course: "Classical Electrodynamics", Physics Degree, Physics Faculty, University of Barcelona: 60 hrs every year, **Theory, Problem classes and organization of the course**.
- from 2010/11 to current:
  -Undergraduate course: "Mathematical Methods in Physics I (MMFI)", Physics Degree, Physics Faculty, University of Barcelona: 60 hrs every year, **Theory, Problem classes and organization of the course**.
- from 2014/15 to current:
  -Postgraduate course: "Gauge Theories of the Standard Model", Physics Faculty, University of Barcelona: 15 hrs every year, **Theory classes**.

- from 2014/15 to 2019/20:
  -Undergraduate course: "Mathematical Analysis II (CDV)"', Biomedical Engineering Degree, Medicine Faculty, UB: 60 hrs every year, **Theory, Problem classes and organization of the course**.

- from 2010/11 to 2013/14:
  -Postgraduate course: "Standard Model",
  Physics Degree, Physics Faculty, University of Barcelona: 30 hrs every year,

- 2012/13: **-Undergraduate course**: "Mathematical Methods in Physics II", Physics Degree, Physics Faculty, University of Barcelona: 20 hrs, **Problem classes**.

- 2012/13: **-Undergraduate course**: "Mathematical Analysis II (CDV)", Physics Degree, Physics Faculty, University of Barcelona: 160 hrs, **Problem classes for several groups**.

- 2010/11:
  -Undergraduate course: tutorial of "Laboratory of Classical Mechanics", Physics and Engineering Degree, Physics Faculty, University of Barcelona: 32 hrs, tutorial for 1 group.

- 2009/10:
  -Undergraduate course: "Advanced Mathematical Methods in Physics", Physics Degree, Physics Faculty, University of Barcelona: 30 hrs, **Problem classes**.

- 2003/4:
  -Undergraduate course: "Classical Mechanics", Department of Physics and Astronomy, University of Southampton, England: 30 hrs, **Problem classes**.
  -Undergraduate course: "Computational Physics", Department of Physics and Astronomy, University of Southampton, England: 40 hrs, Problem classes.

Teaching Material

- "*Introduction to Probability*" (in Catalan), Federico Mescia and Augustí Pérez, Universitat de Barcelona: notes prepared for the course of Mathematical Methods i Physics.

- "*Complex Variables: a collection of solved problems* " (in Catalan), Federico Mescia and Augustí Pérez, Universitat de Barcelona; prepared for the course of Mathematical Methods in Physics.

- "*Probability: a collection of solved problems*" (in Catalan), Prof. Federico Mescia and Augustí Pérez, Universitat de Barcelona; prepared for the course of Mathematical Methods in Physics.

- "*Complex Variables and Probability: Strategic Practice and Homework (solved problems)* " (in Catalan), Federico Mescia, Universitat de Barcelona; prepared for the course of Mathematical Methods in Physics.

- "*The Riemann Surface of* $\arg z$ *by Lluquet and Rovelló*" (in Catalan), Federico Mescia, Universitat de Barcelona; comics prepared for the course of Mathematical Methods in Physics. Lluquet and Rovelló are two classic characters (two shepherds) of Xmas theatre piece in Catalonia. This is the easier way to introduce to students the Riemann surface of $\arg z$, the so-called spiral staircase.

- "*Analysis in Many Variables: a collection of solved problems*" (in Catalan), Prof. Federico Mescia, Universitat de Barcelona; prepared for the course of Mathematical Analysis II. Many examples worked out in Mathematica.

- "*Advanced Mathematical Mathematical Methods: a collection of solved problems*" (in Catalan), Prof. Federico Mescia, Universitat de Barcelona; prepared for the course of Advanced Mathematical Methods in Physics. This is a collection of solved problems in Differential Equations by Frobenius method, Sturm-Liouville Theory, Fourier and Laplace Transforms, Bessel and Green Functions. Selected topics also include physical application of partial differential equation: heat and wave equations, theory of elasticity in one dimension in continuum, hanging chain.

Teaching Habilitation

- Qualified to work at the Full and Associate Professor level in Catalunya, issued by Agència Catalana de Qualitat Universitària (AQU), ref: U1145/12514902-118.

- Qualified to work at French Universities as "maître de conférences" & Professor.

- Habilitation of Associate Professor in Italy (since 2013).

Federico Mescia: Publication List

Publications in Refereed Journals

1. L. Di Luzio, F. Mescia, E. Nardi and S. Okawa,
   "Renormalization group effects in astrophobic axion models,"
   Phys. Rev. D **107** (2022), [arXiv:2205.15326 [hep-ph]].

2. A. Crivellin, M. Kirk, T. Kitahara and F. Mescia,
   "Large $t \to cZ$ as a Sign of Vector-Like Quarks in Light of the W Mass,"
   Phys. Rev. D **106** (2022), L031704, [arXiv:2204.05962 [hep-ph]].

3. L. Di Luzio, M. Fedele, M. Giannotti, F. Mescia and E. Nardi,
   "Stellar Evolution confronts Axion Models,"
   JCAP **02** (2022) no.02, 035, [arXiv:2109.10368 [hep-ph]].

4. D. Espriu, F. Mescia and I. Asiáin,
   "Introducing tools to test Higgs interactions via WW scattering I: one-loop calculations and renormalization in the HEFT,"
   Phys. Rev. D **105** (2022) no.1, 015009, [arXiv:2109.02673 [hep-ph]].

5. L. Allwicher, L. Di Luzio, M. Fedele, F. Mescia and M. Nardecchia,
   "What is the scale of new physics behind the muon g-2?,"
   Phys. Rev. D **104** (2021) no.5, 055035, [arXiv:2105.13981 [hep-ph]].

6. G. Arcadi, L. Calibbi, M. Fedele and F. Mescia,
   "Muon $g-2$ and B-anomalies from Dark Matter,"
   Phys. Rev. Lett. 127 (2021) no.6, 061802, [arXiv:2104.03228 [hep-ph]].

7. A. Abeln *et al.* [IAXO],
   "Conceptual design of BabyIAXO, the intermediate stage towards the International Axion Observatory,"
   JHEP **05** (2021), 137, [arXiv:2010.12076 [physics.ins-det]].

8. L. Di Luzio, M. Fedele, M. Giannotti, F. Mescia and E. Nardi,
   "Solar axions cannot explain the XENON1T excess,"
   Phys. Rev. Lett. 125 (2020) no.13, 131804, [arXiv:2006.12487 [hep-ph]].

9. F. Björkeroth, L. Di Luzio, F. Mescia and E. Nardi,
   "Covert symmetries in the neutrino mass matrix,"
   JHEP **02** (2020), 066, [arXiv:1910.00576 [hep-ph]].

10. R. Coy, M. Frigerio, F. Mescia and O. Sumensari,,
    "New physics in $b \to s\ell\ell$ transitions at one loop,"
    Eur. Phys. J. C **80**, no. 1, 52 (2020) [arXiv:1909.08567 [hep-ph]].

11. F. Björkeroth, L. Di Luzio, F. Mescia, E. Nardi, P. Panci and R. Ziegler,
    "Axion-electron decoupling in nucleophobic axion models,"
    Phys. Rev. D **101** (2020) no.3, 035027, [arXiv:1907.06575 [hep-ph]].

12. E. Armengaud *et al.* [IAXO Collaboration],
    "Physics potential of the International Axion Observatory (IAXO),"
    JCAP **1906**, 047 (2019) [arXiv:1904.09155 [hep-ph]].

13. P. Arnan, A. Crivellin, M. Fedele and F. Mescia,
    "Generic loop effects of new scalars and fermions in $b \to s\ell^+\ell^-$ and a vector-like $4^{\rm th}$ generation,"
    JHEP **1906**, 118 (2019) [arXiv:1904.05890 [hep-ph]].

14. P. Arnan, D. Becirevic, F. Mescia and O. Sumensari,
" Probing low energy scalar leptoquarks by the leptonic W and Z couplings,"
JHEP **1902**, 109 (2019) [arXiv:1901.06315 [hep-ph]].

15. F. Björkeroth, L. Di Luzio, F. Mescia and E. Nardi,
"$U(1)$ flavour symmetries as Peccei-Quinn symmetries,"
JHEP **1902**, 133 (2019) [arXiv:1811.09637 [hep-ph]].

16. L. Di Luzio, F. Mescia, E. Nardi, P. Panci and R. Ziegler,
"Astrophobic Axions,"
Phys. Rev. Lett. **120**, no. 26, 261803 (2018) [arXiv:1712.04940 [hep-ph]].

17. L. Di Luzio, F. Mescia and E. Nardi,
"Window for preferred axion models,"
Phys. Rev. D **96**, no. 7, 075003 (2017) [arXiv:1705.05370 [hep-ph]].

18. L. Di Luzio, F. Mescia and E. Nardi,
"Redefining the Axion Window,"
Phys. Rev. Lett. 118 (2017) no.3, 031801 [arXiv:1610.07593 [hep-ph]].

19. P. Arnan, D. Becirevic, F. Mescia and O. Sumensari,
"Two Higgs doublet models and $b \to s$ exclusive decays,"
Eur. Phys. J. C **77**, no. 11, 796 (2017) [arXiv:1703.03426 [hep-ph]].

20. P. Arnan, L. Hofer, F. Mescia and A. Crivellin,
"Loop effects of heavy new scalars and fermions in $b \to s\mu^+\mu^-$,"
JHEP **1704**, 043 (2017) [arXiv:1608.07832 [hep-ph]].

21. P. Arnan, D. Espriu and F. Mescia,
"Interpreting a 2 TeV resonance in WW scattering,"
Phys. Rev. D **93**, no. 1, 015020 (2016) [arXiv:1508.00174 [hep-ph]].

22. D. Espriu, F. Mescia and A. Renau,
"Axion-Higgs interplay in the two Higgs-doublet model,"
Phys. Rev. D **92**, no. 9, 095013 (2015) [arXiv:1503.02953 [hep-ph]].

23. D. Espriu, F. Mescia
"Unitarity and causality constraints in composite Higgs models,"
Phys. Rev. D **90**, 055002 (2014) [arXiv:1403.7386 [hep-ph]].

24. D. Espriu, F. Mescia and B. Yencho,
"Radiative corrections to WL WL scattering in composite Higgs models,"
Phys. Rev. D **88**, 055002 (2013) [arXiv:1307.2400 [hep-ph]].

25. V. Bertone, N. Carrasco, M. Ciuchini, P. Dimopoulos, R. Frezzotti, V. Gimenez, V. Lubicz and G. Martinelli *et al.*,
"Kaon Mixing Beyond the SM from $N_F = 2$ tmQCD and model independent constraints from the UTA,"
JHEP **1303**, 089 (2013) [arXiv:1207.1287 [hep-lat]].

26. F. Mescia and J. Virto,
"Natural SUSY and Kaon Mixing in view of recent results from Lattice QCD,"
Phys. Rev. D **86**, 095004 (2012) [arXiv:1208.0534 [hep-ph]]. 35 citations counted in INSPIRE as of 29 Jan 2020.

27. D. Becirevic, N. Kosnik, F. Mescia and E. Schneider,
"Complementarity del constraints on New Physics from $B_s \to \mu^+\mu^-$ and from $B \to Kl^+l^-$ decays,"
Phys. Rev. D **86**, 034034 (2012) [arXiv:1205.5811 [hep-ph]].

28. J. Matias, F. Mescia, M. Ramon and J. Virto,
"Complete Anatomy of $\bar{B}_d \to \bar{K}^{*0}(\to K\pi)l^+l^-$ and its angular distribution,"
JHEP **1204**, 104 (2012) [arXiv:1202.4266 [hep-ph]].

29. T. Hapola, F. Mescia, M. Nardecchia and F. Sannino,
"Pseudo Goldstone Bosons Phenomenology in Minimal Walking Technicolor,"
Eur. Phys. J. C **72**, 2063 (2012) [arXiv:1202.3024 [hep-ph]].

30. P. Dimopoulos, F. Mescia and A. Vladikas,
"K vector and tensor couplings from Nf = 2 tmQCD,"*
Phys. Rev. D **84**, 014505 (2011) [arXiv:1104.0188 [hep-lat]].

31. D. Espriu, F. Mescia and A. Renau,
"Axions and high-energy cosmic rays: Can the relic axion density be measured?,
JCAP **1108**, 002 (2011) [arXiv:1010.2589 [hep-ph]].

32. M. Constantinou *et al.* [ETM Collaboration],
"B_K-parameter from N_f = 2 twisted mass lattice QCD,"
Phys. Rev. D **83** (2011) 014505 [arXiv:1009.5606 [hep-lat]].

33. M. Antonelli *et al.*,
"An evaluation of $|Vus|$ and precise tests del Standard Model from world data on leptonic and semileptonic kaon decays,"
Eur.Phys.J.C69:399-424,2010, arXiv:1005.2323 [hep-ph].

34. A.A. Andrianov, D. Espriu, F. Mescia, A. Renau,
"The Axion Shield,"
Phys. Lett. B **684**, 101-105 (2010) arXiv:0907.5158 [hep-ph].

35. G. Amelino-Camelia *et al.*,
"Physics with the KLOE-2 experiment at the upgraded DAϕNE,"
Eur. Phys. J. C **68**, 619 (2010) [arXiv:1003.3868 [hep-ex]].

36. G. Corcella and F. Mescia,
"A Phenomenological Study of Bottom Quark Fragmentation in Top Quark Decay at Hadron Colliders,"
Eur. Phys. J. C **65**, 171-180 (2010) arXiv:0907.5158 [hep-ph].

37. M. Antonelli *et al.*,
"Flavor Physics in the Quark Sector,"
Phys. Rept. **494** (2010) 197 [arXiv:0907.5386 [hep-ph]].

38. V. Lubicz, F. Mescia, S. Simula, C. Tarantino ETM collaboration,
"$K \to$ pion Semileptonic Form Factors from Two-Flavor Lattice QCD,"
Phys. Rev. D **80**, 111502 (2009) arXiv:0906.4728 [hep-lat].

39. B. Blossier *et al.* ETM collaboration,
" Pseudoscalar decay constants of kaon and D-mesons from $N_F = 2$ twisted mass Lattice QCD, ,"
JHEP **0907**, 043 (2009) [arXiv:0904.0954 [hep-lat]].

40. T. Hurth, G. Isidori, J. F. Kamenik and F. Mescia,
" Constraints on New Physics in MFV models: a model-independent analysis of $\Delta F = 1$ processes ,"
Nucl. Phys. B **808**, 326 (2009) [arXiv:0807.5039 [hep-ph]].

41. J. F. Kamenik and F. Mescia,
"$B \to D\tau\nu$ Branching Ratios: Opportunity for Lattice QCD and Hadron Colliders,"
Phys. Rev. D **78**, 014003 (2008) [arXiv:0802.3790 [hep-ph]].

42. The FlaviaNet Kaon Working: M. Antonelli, V. Cirigliano, P. Franzini, S Glazov, R. Hill, G. Isidori, F. Mescia, M. Moulson, M. Palutan, E. Passemar, M. Piccini, M. Veltri, O. Yushchenko, R. Wanke. (`http://www.lnf.infn.it/wg/vus`)
"Precision tests del Standard Model with leptonic and semileptonic kaon decays,"
arXiv:0801.1817 [hep-ph].

43. F. Mescia and C. Smith,
"Improved estimates of rare K decay matrix-elements from $K_{\ell 3}$ decays,"
Phys. Rev. D **76**, 034017 (2007) [arXiv:0705.2025 [hep-ph]].

44. G. Isidori, F. Mescia, P. Paradisi and D. Temes,
"Flavor physics at large $\tan\beta$ with a Bino-like LSP,"
Phys. Rev. D **75**, 115019 (2007) [arXiv:hep-ph/0703035].

45. D. Becirevic, V. Lubicz and F. Mescia,
"An estimate del $B \to K^*\gamma$ form factor,"
Nucl. Phys. B **769**, 31 (2007) [arXiv:hep-ph/0611295].

46. G. Buchalla *et al.*,
"B, D and K decays,"
Eur. Phys. J. C **57** (2008) 309 [arXiv:0801.1833 [hep-ph]].

47. F. Mescia, C. Smith and S. Trine,
"$K_L \to \pi e^+ e^-$ and $K_L \to \mu^+\mu^-$: A binary star on the stage of Flavor physics,"
JHEP **0608**, 088 (2006) [arXiv:hep-ph/0606081].

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"Non-perturbatively renormalised light quark masses from a lattice simulation with $N_F = 2$,"
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50. G. Isidori, F. Mescia, P. Paradisi, C. Smith and S. Trine,
"Exploring the Flavor structure del MSSM with rare K decays,"
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51. D. Guadagnoli, F. Mescia and S. Simula,
"Lattice study of semileptonic form factors with twisted boundary conditions,"
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52. G. Isidori, F. Mescia and C. Smith,
"Light-quark loops in $K \to \pi\nu\nu$,"
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53. V. Gimenez, V. Lubicz, F. Mescia, V. Porretti and J. Reyes,
"Operator product expansion and quark condensate from lattice QCD in coordinate space,"
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54. D. Becirevic, G. Isidori, V. Lubicz, G. Martinelli, F. Mescia, S. Simula, C. Tarantino, G. Villadoro,
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55. J. M. Flynn, F. Mescia and A. S. B. Tariq [UKQCD Collaboration],
"Sea quark effects in B_K from $N_F = 2$ clover-improved Wilson fermions,"
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"Lifetime differences and CP violation parameters of neutral B mesons at the next-to-leading order in QCD,"
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57. J. M. Flynn, F. Mescia and A. S. B. Tariq [UKQCD Collaboration],
"Spectroscopy of doubly-charmed baryons in lattice QCD,"
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"Lifetime ratios of beauty hadrons at the next-to-leading order in QCD"
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60. M.Ciuchini, E.Franco, V.Lubicz and F.Mescia,
"Next-to-leading order QCD corrections to spectator effects in lifetimes of beauty hadrons"
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"Heavy $\to$ Light semileptonic decays of pseudoscalar mesons from lattice QCD"
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62. D.Becirevic, V.Lubicz, G.Martinelli, F.Mescia
"First Lattice Calculation del Electromagnetic Operator Amplitude $\langle\pi^0|Q_\gamma^+|K^0\rangle$"
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63. D.Becirevic, Ph.Boucaud, J.P.Leroy, V.Lubicz, G.Martinelli, F.Mescia and F.Rapuano
"Non-perturbatively Improved Heavy-Light Mesons: Masses and Decay Constants"
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64. D.Becirevic, Ph.Boucaud, J.P.Leroy, V.Lubicz, G.Martinelli and F.Mescia
"Non-perturbatively Renormalized Light-Quark Masses with the Alpha Action"
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Conference Proceedings

1. D. Becirevic, N. Kosnik, F. Mescia and E. Schneider,
"Complementarity of $B_s \to \mu^+\mu^-$ and $B \to Kl^+l^-$ in New Physics searches,"
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2. P. Dimopoulos *et al.*,
"K-meson vector and tensor decay constants and BK-parameter from Nf=2 tmQCD,"
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3. F. Mescia,
"Precision tests with $K_{\ell 3}$ and K_{l2} decays,"
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4. D. Becirevic, B. Haas and F. Mescia,
"Semileptonic D-decays and Lattice QCD,"
arXiv:0710.1741. Proceedings Lattice 2007, Regensburg, Germany 21-27 Luglio 2007.

5. F. Mescia,

   "Non-perturbative inputs for Flavor physics,"

   Pavia 2006, High energy physics* 279-283. Proceedings IFAE 2006, Pavia, Italia, 19-21 Aprile 2006.

6. F. Mescia,

   "Rare kaon decays $K \to \pi\, \nu\bar{\nu}$ and $K_L \to \pi^0 \ell^+ \ell^-$,"

   PoS **HEP2005**, 267 (2006) [arXiv:hep-ph/0512142]. Proceedings at EPS International Europhysics Conference on High-Energy Physics (HEP-EPS 2005), Lisbon, Portugal, 21-27 Luglio 2005.

7. F. Mescia,

   "Recent theoretical progress in kaon physics,"

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8. F. Mescia,

   "V_{us} from K_{l3} decays"

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11. F. Mescia, V. Gimenez, V. Lubicz, G. Martinelli, S. Simula and C. Tarantino,

    "Kaon B-parameter with $N_F = 2$ dynamical Wilson fermions,"

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    Nucl. Phys. Proc. Suppl. **140** (2005) 387. Proceedings del 22nd International Symposium on Lattice Field Theory (Lattice 2004), Batavia, Illinois, 21-26 Giugno 2004.

13. D. Becirevic, P. Boucaud, V. Gimenez, V. Lubicz, G. Martinelli, F. Mescia, S. Simula, C. Tarantino

    "Light hadron spectrum, renormalization constants and light quark masses with two dynamical fermions,"

    Nucl. Phys. Proc. Suppl. **140**, 246 (2005) [arXiv:hep-lat/0409110]. Proceedings del 22nd International Symposium on Lattice Field Theory (Lattice 2004), Batavia, Illinois, 21-26 Giugno 2004.

14. J. M. Flynn, F. Mescia and A. S. B. Tariq,

    "Sea quark effects in B_K from $N_F = 2$ clover-improved Wilson fermions,"

    Nucl. Phys. Proc. Suppl. **140**, 359 (2005) [arXiv:hep-lat/0409075]. Based on talks at 22nd International Symposium on Lattice Field Theory (Lattice 2004), Batavia, Illinois, 21-26 Giugno 2004 and at 32nd International Conference on High-Energy Physics (ICHEP 04), Beijing, China, 16-22 Aug 2004.

15. A. Abada, D. Becirevic, P. Boucaud, J. M. Flynn, J. P. Leroy, V. Lubicz and F. Mescia,

    "Heavy to light vector meson semileptonic decays,"

    Nucl. Phys. Proc. Suppl. **119**, 625 (2003) [arXiv:hep-lat/0209116]. Proceedings of 20th International Symposium on Lattice Field Theory (LATTICE 2002), Boston, Massachusetts, 24-29 Giugno 2002.

16. F. Mescia,

    "Lifetimes of beauty hadrons: QCD corrections to spectator effects,"

    Published in *Roma 2001, LEP physics* 263-266. Prepared for 13th Italian Workshop on LEP Physics (LEP 2001), Roma, Italia, 18-20 Apr 2001.

17. A. Abada, D. Becirevic, P. Boucaud, J. P. Leroy, V. Lubicz, G. Martinelli and F. Mescia,
"Decays of heavy mesons,"
Nucl. Phys. Proc. Suppl. **83**, 268 (2000) [arXiv:hep-lat/9910021]. Proceedings del 17th International Symposium on Lattice Field Theory (LATTICE 99), Pisa, Italia, 29 Giugno - 3 Luglio 1999.

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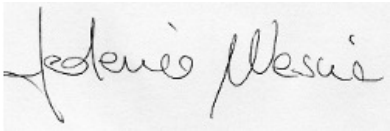
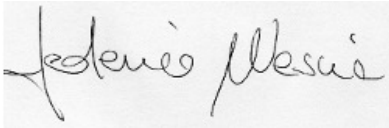


Barcelona, November, 24 2023



Curriculum vitae

INFORMAZIONI PERSONALI

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ESPERIENZA LAVORATIVA

2020– Primo Ricercatore, INFN, Sezione di Ferrara

2017–2019 Ricercatore, INFN, Sezione di Ferrara

2012-2017 Assegnista di Ricerca, Università di Ferrara, Dip. di Fisica e Scienze della Terra

2011-2012 Assegnista di Ricerca, Università di Milano-Bicocca, Dip. di Fisica

2009-2011 Assegnista di Ricerca, Università di Roma Sapienza, Dip. di Fisica

2006-2008 Ricercatore Post-doc, University of Oxford (UK), Physics Department

2006 Borsista, Instituto de Física Corpuscular, Valencia (ES)

2005 Collaboratore scientifico, International Centre for Relativistic Astrophysics (IT)

ISTRUZIONE E FORMAZIONE

2005 Dottorato di Ricerca in Fisica, “Constraining neutrino physics with cosmological observations”

Dip. di Fisica, Università di Roma La Sapienza

2001 Laurea in fisica “Strutture cosmologiche indotte da neutrini massivi”

Dip. di Fisica, Universitá di Roma La Sapienza, 110 e lode

Lingua madre Italiano

Altre lingue

	COMPRENSIONE		PARLATO		PRODUZIONE SCRITTA
	Ascolto	Lettura	Interazione	Produzione orale	
Inglese	C1	C1	C1	C1	C1
Spagnolo	C1	C1	C1	C1	C1

Livelli: A1 e A2: Utente base – B1 e B2: Utente autonomo – C1 e C2: Utente avanzato

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ULTERIORI INFORMAZIONI

Pubblicazioni e conferenze

- Autore di più di 150 articoli su riviste scientifiche con referee. Lavori selezionati in calce. Per elenco completo vedere:
  INSPIRE ID: INSPIRE-02702873.
  https://inspirehep.net/author/profile/M.Lattanzi.1
  ORCID ID: 0000-0003- 1059-2532.
  https://orcid.org/0000-0003-1059-2532
- Più di 60 seminari a congressi e workshop internazionali, di cui più di 40 su invito e circa 20 in sessione plenaria. Seminari selezionati in calce.
- H-index 55, Numero di citazioni >30.000, senza autocitazioni >29.000, articoli citanti: 21.470 (fonte: ISI Web of science).

Responsabilità di studi e ricerche scientifiche
Incarichi di coordinamento

- 2022 - in corso: Membro del WG “Computing Models” del Coordinamento Nazionale per il Calcolo dell’INFN.
- 2021: Coordinamento White Paper su “Synergy between cosmological and laboratory searches in neutrino physics” per Snowmass 2021
- 2021 – in corso: Coordinatore del Project Study Paper su “Reionization and Neutrino Masses” della collaborazione LiteBIRD.
- 2020 – in corso: Responsabile Scientifico Nazionale dell’Iniziativa Specifica (IS) InDark (Inflation, Dark Matter and the Large-Scale Structure of the Universe) dell’Istituto Nazionale di Fisica Nucleare.
- 2020 – in corso: Responsabile del calcolo HPC per il progetto InDark al Cineca.
- 2020 – in corso: Coordinatore del Work Package (WP) sulla likelihood per la cross-correlazione con la CMB e punto di contatto con l’IST:likelihood, all’interno dell’esperimento Euclid.
- 2020 Punto di contatto per una Letter of Intent (LoI) “Neutrinos across Frontiers” per Snowmass 2021.
- 2019 – in corso: Responsabile Scientifico Locale della sigla sperimentale Euclid dell’Istituto Nazionale di Fisica Nucleare per il nodo di Ferrara.
- 2019 - in corso: Responsabile scientifico per il "meta-pacchetto" di lavoro WP-3200 "Fundamental physics" in seno all’accordo attuativo 2020-9-HH.0 dell’accordo quadro 2016-28-H.0 per la partecipazione italiana alla fase A della missione LiteBIRD, stipulato tra l’Agenzia Spaziale Italiana e il Dipartimento di Fisica dell’Università di Roma Tor Vergata.
- 2018-2021: Responsabile scientifico del progetto triennale “Theoretical and Experimental Challenges in Neutrino Cosmology” (TEC-NU) assegnato dall’Istituto Nazionale di Fisica Nucleare. Importo finanziato: 20.000 EUR.
- 2013: Responsabile scientifico del progetto "Il Cosmo come laboratorio di fisica del neutrino", della durata di tre mesi, assegnato tramite il bando 2013 dell’Università di Ferrara per la mobilità internazionale dei giovani ricercatori non strutturati. Importo finanziato: 3.850 EUR.
- 2011 Responsabile scientifico del progetto "Constraining dark matter properties through indirect observations", finanziato tramite bando della Accademia dei Lincei/Royal Society. Il finanziamento è stato erogato in forma di borsa di studio della durata di 5 mesi [usufruito solo dei primi due mesi]. Importo totale: 6.500 EUR.

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Collaborazioni e partecipazioni a progetti

- 2020 - in corso: Membro della collaborazione Simons Observatory
- 2018 – in corso: Membro del gruppo LiteBIRD-Italia e LiteBIRD-Eu, lo studio di phase A del satellite JAXA LiteBIRD. La partecipazione al phase A di LiteBIRD per l'Italia è finanziata da ASI.
- 2017 – 2020 Membro del WP 7-6X1: "Astroparticle and fundamental physics" del progetto ASI/COSMOS.
- 2016-2018 Membro dei gruppi di lavoro "Cosmological Parameters" e "Simulations and Systematics" del satellite CORE per polarizzazione del CMB, sottomesso a ESA (call M5).
- 2016 – in corso: Membro del consorzio Euclid. Membro del science working group CMBX.
- 2015 – in corso: Membro della collaborazione LSPE (Large Scale Polarization Explorer), un pallone stratosferico finanziato da ASI e INFN per studiare la polarizzazione del CMB alle grandi scale angolari.
- 2014 - 2019: Planck Scientist per il satellite ESA/Planck. In virtù del loro contributo, i Planck Scientists hanno il diritto di firmare tutti gli articoli scientifici della missione.
- 2013: Membro della proposta PRISM. Co-autore dei proposal PRISM/CORE sottomessi a ESA in risposta a diverse call per proporre un satellite post-Planck dedicato allo studio della polarizzazione del CMB.
- 2012 - 2019: Membro del Core Team dello strumento LFI a bordo di Planck. Attività principali: sviluppo e validazione del codice di likelihood, stima dei parametri cosmologici.

Premi e riconoscimenti per l'attività scientifica

- 2018: Gruber Prize in Cosmology 2018, assegnato dalla Gruber Foundation ai membri del Planck Team (lista completa dei membri disponibile all'url https://gruber.yale. edu/cosmology/2018/planck-team
- 2005: Menzione d'onore della Società Astronomica Italiana per la tesi di Dottorato

Abilitazioni e idoneità

- 2018-2024 Abilitazione Scientifica Nazionale come Professore di II Fascia nel settore 02/A2 - Fisica Teorica delle Interazioni Fondamentali
- 2018-2024 Abilitazione Scientifica Nazionale come Professore di II Fascia nel settore 02/C1 - Astronomia, Astrofisica, Fisica della Terra e dei Pianeti
- 2021-2030 Abilitazione Scientifica Nazionale come Professore di I Fascia nel settore 02/A2 - Fisica Teorica delle Interazioni Fondamentali
- 2021-2030 Abilitazione Scientifica Nazionale come Professore di I Fascia nel settore 02/C1 - Astronomia, Astrofisica, Fisica della Terra e dei Pianeti

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Attività didattica

- 2023: Titolare del corso “Bayesian Inference”, Laurea Magistrale in Physics, Universitá d Ferrara.
- 2022: corso “Neutrino Cosmology and Dark Matter” alla SIGRAV International School 2022 on Cosmology: from Theory to observation.
- 2021: corso “Neutrino Cosmology” alla ISAPP 2021 Summer School on “Neutrino Physics, Astrophysics and Cosmology”, Valencia.
- 2020 - oggi: Membro del Collegio dei Docenti, Corso di Dottorato in Fisica, Università di Ferrara
- 2018 - oggi: Particle Cosmology – Programma Ph.D. in Fisica, Università di Ferrara
- 2018 - oggi: Neutrino Cosmology, all’interno del corso Neutrino Physics per il programma Ph.D. in Fisica, Università di Padova
- 2018 - 2023: Titolare del corso “Elementi di Cosmologia”, Laurea Triennale in Fisica, Università di Ferrara
- 2017: Supporto per il corso "Relativity", Laurea Magistrale in Fisica, Università di Ferrara
- 2017: Supporto per il corso "Mathematical Methods for Physics", Laurea Magistrale in Fisica, Università di Ferrara
- 2004 - oggi: Relatore e corelatore di 15 tesi di laurea triennale, 7 tesi di laurea magistrale, 6 tesi di dottorato presso le Università di Ferrara, Padova, Roma La Sapienza, Roma Tor Vergata

Attività di divulgazione e orientamento

- 2023: Partecipazione come relatore all’evento “Le Prospettive dello Spazio - Terza edizione: La cosmologia e JRR Tolkien”.
- 2022-2023: Organizzazione dello stand di cosmologia UniFE/INFN per la Notte dei Ricercatori
- 2022 – oggi: Partecipazione alle attività di divulgazione della sezione di Ferrara dell’INFN (Lab2Go, Aggiornamenti)
- 2019: Seminario divulgativo “L’inflazione cosmica e l’origine dell’Universo” nell’ambito della manifestazione Pint of Science.
- 2017: Dibattito in occasione dellla proiezione del film “Il senso della bellezza”.
- 2015 – oggi: Partecipazione alle attività di divulgazione organizzate dall’Università di Ferrara e rivolte agli studenti della scuola superiore (“Laboratori di Fisica Moderna”, “Stage Estivi di Fisica”, “Corso di Eccellenza”).

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Pubblicazioni selezionate

1. *Synergy between cosmological and laboratory searches in neutrino physics*
   M. Gerbino, E. Grohs, M. Lattanzi et al., *Phys. Dark Univ.* **42** (2023) 101333.

2. *Probing Lorentz-violating electrodynamics with CMB polarization*
   L. Caloni et al., *J. Cosmol. Astropart. Phys.* **03** (2023) 018.

3. *Do you smell something decaying? Updated linear constraints on decaying dark matter scenarios*
   S. Alvi, T. Brinckmann, M. Gerbino, M. Lattanzi, L. Pagano, *J. Cosmol. Astropart. Phys.* **11** (2022) 015.

4. *Neutrino mass and mass ordering: no conclusive evidence for normal ordering*
   S. Gariazzo et al., *J. Cosmol. Astropart. Phys.* **10** (2022) 010.

5. *Novel cosmological bounds on thermally-produced axion-like particles*
   L. Caloni, M. Gerbino, M. Lattanzi, L. Visinelli *J. Cosmol. Astropart. Phys.* **09** (2022) 021.

6. *Updated cosmological constraints on Macroscopic Dark Matter*
   L. Caloni, M. Gerbino, M. Lattanzi, *J. Cosmol. Astropart. Phys.* **07** (2021) 027.

7. *Thermal axions with multi-eV masses are possible in low-reheating scenarios*
   P. Carenza, M. Lattanzi, A. Mirizzi, F. Forastieri, *J. Cosmol. Astropart. Phys.* **07** (2021) 031.

8. *Probing Cosmic Inflation with the LiteBIRD Cosmic Microwave Background Polarization Survey*
   LiteBIRD collaboration, Prog. Th. Exp. Phys., 2022, ptac150

9. *Euclid preparation - XV. Forecasting cosmological constraints for the Euclid and CMB joint analysis*
   S. Ilic et al. (Euclid collaboration), Astron.Astrophys. 657 (2022) A91

10. *Cosmic Microwave Background Polarization as a Tool to Constrain the Optical Properties of the Universe*
    M. Lembo, M. Lattanzi, L. Pagano, A. Gruppuso, P. Natoli, F. Forastieri, *Phys. Rev. Lett.* **127**, 011301 (2021).

11. *Bounds on light sterile neutrino mass and mixing from cosmology and laboratory searches*
    S. Hagstotz, P. F. de Salas, S. Gariazzo, M. Gerbino, M. Lattanzi, S. Vagnozzi, K. Freese, S. Pastor, *Phys. Rev. D* **104**, 123524 (2021).

12. *Planck 2018 results. V. CMB power spectra and likelihoods*
    Planck collaboration, *Astron. Astrophys.* **641** A5 (2020).

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13. *Planck 2018 results. VI. Cosmological parameters*
Planck collaboration, *Astron. Astrophys.* **641** A6 (2020).

14. *Likelihood methods for CMB experiments*
M. Gerbino et al., in "Status and Prospects of Cosmic Microwave Background Analysis" in Frontiers in Astronomy and Space Sciences, Front.in Phys. 8 (2020) 15.

15. *A novel CMB polarization likelihood package for large angular scales built from combined WMAP and Planck LFI legacy maps*
U. Natale et al., Astron.Astrophys. **644** (2020) A32.

16. *Cosmological constraints on neutrino self-interactions with a light mediator*
F. Forastieri, M. Lattanzi, P. Natoli, *Phys. Rev. D* **100**, 103526 (2019).

17. *A novel approach to quantifying the sensitivity of current and future cosmological datasets to the neutrino mass ordering through Bayesian hierarchical modeling*
M. Gerbino, M. Lattanzi, O. Mena and K. Freese, *Phys. Lett. B* **775**, 239 (2017).

18. *Status of neutrino properties and future prospects - Cosmological and astrophysical constraints*
M. Gerbino and M. Lattanzi, invited review for the research topic “The Physics Associated with Neutrino Masses”, *Front. Phys.* 5:70 (2018).

19. *Unveiling ν secrets with cosmological data: neutrino masses and mass hierarchy*
S. Vagnozzi et al, *Phys. Rev. D* **96**, 123503 (2017).

20. *Planck 2015 results. XI. CMB power spectra, likelihoods, and robustness of parameters*
Planck collaboration, *Astron. Astrophys.* **594** A11 (2016).

21. *Bounds on very low reheating scenarios after Planck*
P.F. de Salas, M. Lattanzi, G. Mangano, G. Miele, S. Pastor, O. Pisanti, *Phys. Rev. D* **92**, 123534 (2015).

22. *Can the WIMP annihilation boost factor be boosted by the Sommerfeld enhancement?*
M. Lattanzi, J. Silk, *Phys. Rev. D* **79**, 083523 (2009).

23. *X-ray photons from late-decaying majoron dark matter*
F. Bazzocchi, M. Lattanzi, S. Riemer-Sørensen, J.W.F. Valle, *J. Cosmol. Astropart. Phys.* **08** (2008) 013.

24. *Decaying warm dark matter and neutrino masses*
M. Lattanzi, J.W.F. Valle, *Phys. Rev. Lett.* **99**, 121301 (2007).

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Seminari selezionati **Talk plenari**

1. *Observational cosmology - overview*
   TAUP, Vienna, 28 Ago. - 1 Set. 2023
2. *Cosmological constraints on neutrinos and other light relics*
   The physics of two infinities, Kyoto, 27-30 Mar. 2023
3. *Computational physics for theoretical cosmology*
   SM&FT 2022 - The XIX workshop on statistical mechanics and non-perturbative field theory, Bari, 19-21 Dec. 2022
4. *Cosmology and neutrino properties*
   Neutrino Oscillation Workshop, Rosa Marina, Sept. 2022
5. *Particle and energy composition of the Universe: neutrinos, light relics and dark matter*
   From Planck to the future of the CMB, Ferrara, May 2022
6. *Probing neutrino physics with cosmological observations*
   The Fourth Zeldovich Meeting, September 10th, 2020.
7. *Latest news from the cosmo: current status and challenges in cosmology*
   Young Researchers' Meeting, Roma, June 19th, 2019.
8. *Active neutrinos and their sterile cousins in cosmology*
   Universum 2019, Milano, Apr. 2019
9. *Neutrino properties from cosmology*
   NuPhys 2018, London., December 2018.
10. *Round table: Axion physics - status, prospects and challenges*
    XIIIth Quark Confinement and the Hadron Spectrum, Maynooth University, 31 July - 6 August 2018.
11. *Particle Cosmology: From Neutrino Physics To Stringy Inflation*
    New Frontiers in Theoretical Physics - XXXVI Convegno Nazionale di Fisica Teorica, Cortona, May 23-26, 2018.
12. *Neutrino masses from cosmology*
    53rd Rencontres de Moriond on Electroweak Interactions and Unified Theories, La Thuile, March 10-17, 2018.
13. *Constraints on inflation from observations of the Planck satellite*
    Advances in theoretical cosmology in light of data, Stockholm University, July 3-28, 2017.
14. *Constraining neutrino physics through CMB observations*
    Colloquium at the Oskar Klein Centre for Cosmoparticle Physics, Stockholm University.
15. *Constraining neutrino physics through CMB observations*
    Colloquium at the Physics Department, Universitá di Roma Tre.
16. *Neutrino Cosmology: current results*
    Neutrino Oscillation Workshop 2016, Otranto, September 4-11, 2016
17. *Constraining non-standard neutrinos with CMB observations*
    "Planck 2016: From the Planck scale to the Electroweak scale", Valencia (ES), 23-27 May 2016.
18. *Cosmological constraints on light sterile neutrinos*
    Workshop on "Short baseline neutrino oscillation physics", University of Pittsburgh (US), 26-27 January 2016.

Autorizzo il trattamento dei miei dati personali presenti nel CV ai sensi del Decreto Legislativo 30/06/2003, n. 196 "Codice in materia di protezione dei dati personali" e dell'art. 13 del GDPR (Regolamento UE 2016/679).

Curriculum vitae Enrico Nardi (October 22, 2023)

PERSONAL INFORMATION

Name: Enrico Nardi
Nationality: Italian
Languages: Italian, English, Spanish, French
Institution: Istituto Nazionale di Fisica Nucleare – Laboratori Nazionali di Frascati (INFN-LNF)
ORCID: 0000-0001-7165-3808 Google Scholar: Enrico Nardi
Web site: www.lnf.infn.it/~enardi

EDUCATION

1991 Ph.D. SISSA (Trieste, IT). Title: *"Exotic fermion phenomenology"*, Supervisor: Prof. A. Masiero
1990 *Research Associate* in the Program for Advanced Graduate Student, CERN (Geneva, CH)
1989 M. Sc. in Elem. Particles (30/30 *cum Laude*), SISSA (Trieste, IT), Supervisor: Prof. D. Amati
1987 Degree in Theoretical Physics, Univ. of Trieste, (110/110 *cum Laude*), Supervisor: Prof. G. Furlan

CURRENT POSITION

2023- Principal Investigator, National Institute of Chemical Physics and Biophysics, Tallinn, Estonia
2023- INFN Associate. (2019-22 Research Director; 2009-19 Senior Researcher; 2001-09 Researcher)
2018- Italian ASN level 1 (qualification as a full professor). All indicators well above threshold

PREVIOUS POSITIONS

2010-2011 Visiting Professor, Madrid Autonoma U. & Institute for Theoretical Physics (Madrid, ES)
1997-2009 Professor of Physics, Postgraduate program, University of Antioquia (Medellín, CO)
1994-1997 Research fellow, Feinberg Graduate School, Weizmann Institute of Science (Rehovot, IL)
1991-1994 Research fellow, Particle Theory Group, Physics. Dept., U. of Michigan, (Ann Arbor, USA)

AWARDS, GRANTS AND RECOGNITIONS

2023 "Chercheur invité du service Physique Théorique", Université Libre de Bruxelles, Belgium
2022- Awarded a five years *Team Grant* from the Estonian Research Council.
2018-2022 Three M. de Maeztu Visiting Scientist grants (2018, 2019, 2022) from U. de Barcelona (ES).
2017 & 2020 Highlight as Physics Review Letters Editors' Suggestion for two papers on axions: doi:10.1103/PhysRevLett.118.031801 (2017) and doi:10.1103/PhysRevLett.125.131804 (2020), for "particular importance, innovation, and broad appeal".
2018-2019 Two Simons Foundation grants from ACP (Aspen, USA) as Leader of "Working Group on Axions (2019) and as invited expert in the workshop "Origin of the baryon-asymmetry" (2018).
2014-2017 Projects of significant national interest (PRIN) grant: Coordinator for LNF and RM1 nodes.
2010-2011 INFN-MICINN ACI2009-1038 grant for collaboration between LNF and U. of Barcelona.
2009 Faculty of Science, UdeA: Plaque and letter of commendation for: *'commitment, responsibility, ethics, honesty, initiative, vocation, leadership, always accompanied by excellent human relations, which leave an indelible mark on our institution…'* (Awarded on the day I resigned).
2006 Faculty of Science, UdeA: Parchment: *'In recognition of the leadership of the HE group and for the contributions to the excellence and development of scientific research in the Faculty'*.
2003- European member of the Int. Scientific Committee of the "HEP Latin American Symposium".
1998-2007 PI of three COLCIENCIAS (CO) national grants (B-physics, Supernova neutrinos, Leptogenesis), and four University (UdeA, CO) research grants (ν-oscillations, ν's in supersymmetry, GUT Yukawa couplings, and as HEP Group Coordinator) ($\approx$ 250 k€ total).

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

1997-2019 Supervision of 5 Ph.D. (D. Guetta, J. M. Mira, J. I. Zuluaga, L. A. Muñoz, C. D. Ruiz Carvajal), 5 M.Sc. and 2 B.Sc. students (*all presently holding academic postions*).
2007-2020 Supervision of 13 postdocs: D. Aristizabal Sierra, E. Peinado, C. S. Fong, A. Meroni, S. Boucenna, M. Krauss, F. Björkeroth, F. Giacchino, L. Visinelli, L. Darmé, G. Grilli di Cortona, A. Plascencia, F. Arias-Aragón.

TEACHING ACTIVITIES

Postgraduate Courses (14 semesters): Introduction to QFT, Supersymmetry, Physics of the Early Universe, Advanced topics in the SM, Neutrinos in Physics and Astrophysics (UdeA), Standard Model II (UAM)
Undergraduate Courses (5 Semesters): Electromagnetism I, Subatomic Physics (UdeA)
Short postgraduate courses: Odense Winter School on Theoretical Physics, CP3-Origins, (2017), University of Barcelona (2010), U. San Carlos de Guatemala (2007), AstroScuola 2001 - Otranto (Lecce).

ORGANISATION OF SCIENTIFIC MEETINGS

2023 Proposer/Contact person: GGI Workshop on Axions (Arcetri, Florence, April 26 - June 9, 2023)
2023 Local Organizer: "DΛrk Energy" Conference (LNF, Frascati, September 11 - 15, 2023)
2023 Co-organizer: School Origin of Matter Domination (ICTP-SAIFR, Brasil, Nov. 20 - Dec. 1, 2023)
2022 Co-organizer: XX LNF Summer School "Bruno Touschek" (LNF, Frascati, July 11 - 15, 2022)
2019 Proposer/Group leader: Aspen Working Group *"The landscape of QCD axion models"*
2019 Organiser: LNF Institutes *"Axions & NGB"* and *"Axions in Astrophysics and Cosmology"*
2019 Co-organiser: LNF Autumn Institute *"Directional Sub-GeV DM Detection"* (Chair: M. Benito)
2019 Deviser/co-organiser of the Rome Physics Encounters @ LNF (3 editions. Chair: L. Darmé)
2019 Convener of the *"Ultralight Dark Matter"* session at the 3rd LDMA conference (Venice, IT)
2018 Co-organiser: XIX LNF Spring School "Bruno Touschek" (LNF, Frascati, May 7 - 11, 2018)
2018 Organiser: LNF Summer Institute *"Flavor Physics, axions phenomenology and dark sectors"*
2014-2017 Deviser and main organiser of the *"Rome Joint Workshops"* series (6 workshops held)
2009-2016 Director of the *" Frascati Spring School Bruno Touschek"* (5 editions). Deviser and director of the Young Researcher Workshops *"Physics challenges in the LHC era"* (5 editions)
1997-2009 Local Org. Committee co-chair: 5th Latin American CERN School (Medellín, CO). Co-Chair: International Meeting on Leptogenesis (Medellín, CO). Chair: III Latin American Symposium on High Energy Physics, (SILAFAE-III), Cartagena de Indias, (CO). Convener of the session: *Neutrino Physics, Astrophysics and Cosmology*, 10th Marcel Grossmann Meeting, Rio de Janeiro (BR). Chair: 3rd Latin American Symposium on HEP (SILAFAE-III), Cartagena de Indias, (CO). Director: Colombian School in Theoretical Physics, San Andres Islas, (CO)

INSTITUTIONAL RESPONSIBILITIES

2023- Member of the Editorial Board of the APS journal *Physical Review Letters* (ISSN 0031-9007)
2021- Member of the Editorial Board of the journal *Particles* (ISSN 2571-712X)
2019-2022 In charge of the postdoctoral "Cabibbo Fellowship" in the memory of Prof. Nicola Cabibbo
2015-2022 Coordinator of the Theory Group of the Frascati National Laboratories (LNF)
2015-2022 Member of the INFN National Scientific Theory Commission (CSN4)
2014-2017 Local LNF responsible for the grant PRIN-2012 in Theoretical Astroparticle Physics
2009- Member of various selection committees for INFN/LNF postdoctoral positions
2002- LNF responsible of the INFN "Iniziativa Specifica" *Theoretical Astroparticle Physics* (TAsP)
2002-2007 Federation Arrangement: Abdus Salam ICTP (Trieste, IT) and Physics Institute (UdeA, CO)
2001-2002 Cooperation Agreement COLCIENCIAS/CSIC: Phys. Inst. (UdeA, CO) - U. Valencia (ES)
1998-2008 Head of the High Energy Particle Physics Group (GFIF), U. Antioquia (CO)

REVIEWING ACTIVITIES

2018-2019 Projects reviewer: FELLINI-Fellowships, co-financed through the MSC COFUND Action
2015- Internal referee for Astroparticle Theory, INFN National Scientific Commission 4 (CSN4)
1993- Referee for all major Particle Phys. Journals (PRL, PRD, NPB, PLB, JHEP, JCAP, etc.)
2002- Reviewer for: National Research Agency (ANR) (FR); FONDECYT (CL); Erwin Schrödinger International Inst. (Vienna U.); National Science Centre (PL); COLCIENCIAS & Codi (CO).

OUTREACH & SCIENTIFIC DISSEMINATION

2002-2022 Six conferences for general public and in high schools (Colombia, Guatemala, Italy)
2020 Collaboration with the LNF *"Information and Scientific Dissemination Service"*
2017 Divulgative article in "LNF highlights 2016": *Where should we search to find the Axion?*
2015-2016 Three lectures at the 11th (2015) and 12th (2016) IPPOG International Masterclass at LNF
2006- Scientific Collaborator for the INFN outreach project "Scienza Per Tutti"
2001 Outreach conference:"From Quarks to the Cosmos". Physics course for high school teachers

SCIENTIFIC OUTPUT AND METRICS (inSPIRE Database)
Search filter: `find a Nardi,E and date > 1988 and not t ions`

- 89 articles in peer-reviewed journals (82 with 5 or less authors) with more than 6800 citations
- 118 citable papers (including proceedings and reports) with more than 7700 citations
- average citations per paper: 77;
- h-index: 40

MAJOR SCIENTIFIC COLLABORATIONS

Counting only articles with two-to-five authors, I have 74 papers with 75 different co-authors from institutes all around the world, including 14 with C.S. Fong (Sao Paulo, BR), 12 with L. Di Luzio (Padova, IT), 9 with E. Roulet (CAB Bariloche, AR), 9 with F. Mescia (Barcelona, ES), 7 with L. Darmé (IP2I, France), 6 with Y. Grossman (Cornell, USA), Y. Nir (Weizmann Inst., IL), D. Aristizabal (Santa María U., CL), M.C. Gonzalez-Garcia (Stony Brook, USA). Several collaborators of mine were students/postdocs at the beginning of the collaboration.