Francesco Bigazzi, short CV

Present Position

- Primo Ricercatore INFN, Firenze.

Other roles

- Coordinatore del gruppo teorico, INFN Firenze.
- Professore a contratto, presso il Dipartimento di Fisica e Astronomia, Universitá di Firenze.
- Membro del Consiglio di Centro del Galileo Galilei Institute (GGI), Firenze.

Previous positions

- INFN Researcher, 2011 - 2019. INFN Pisa and Firenze.
- Marie Curie Fellow, Firenze University, 2010-2012.
- Doktor Assistant, Institute of Theoretical Physics, K.U. Leuven, Belgium, 2010.
- Postdoc researcher (ULB-FNRS Fellowship), Institute de Physique mathematique des interactions fondamentales et International Solvay Institutes for Physics and Chemistry, Université Libre de Bruxelles, Belgium. 2007-2009.
- Postdoc researcher (INFN and Marie Curie Fellow), Laboratoire de Physique Theorique et Hautes Energies (LPTHE), Universites Pierre et Marie Curie (P6) et Denis Diderot (P7), Paris, France. 2004 - 2006.
- Postdoc Researcher (ICTP Fellowship), Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy. 2001- 2004.

Studies

- Ph.D. in Physics, Milano University, 2001. Advisor Luciano Girardello, co-advisor Alberto Zaffaroni.
- M.Sc. in Physics, cum laude, Firenze University, 1997. Advisor: Luca Lusanna.

Publications

I have (co)-authored 63 papers (see the Inspire database for a complete list) mostly in the field of String Theory and Applied Holography.

Teaching

- Docente del corso di Elementi di gravitá quantistica, Laurea Magistrale in Scienze Fisiche e Astrofisiche, Universitá di Firenze.
- Relatore di tesi di laurea magistrale e di dottorato.

Ilaria Brivio | Curriculum Vitae

Current position

Senior assistant professor – tenure-track (RTDb) — **Nov. 2022 – present**
Dipartimento di Fisica e Astronomia, — *Bologna (Italy)*
Alma Mater Studiorum – Università di Bologna

Previous positions

SNF Professor — **Jun. – Oct. 2022**
Physik-Institut, University of Zurich — *Zurich (Switzerland)*

Akademische Rätin auf Zeit — **Mar. 2019 – May 2022**
Institut für Theoretische Physik, Universität Heidelberg — *Heidelberg (Germany)*

Postdoctoral researcher — **Oct. 2016 – Feb. 2019**
Niels Bohr International Academy and Discovery Center, Niels Bohr Institute, University of Copenhagen — *Copenhagen (Denmark)*

Profesor Ayudante — **Oct. 2015 – Sep. 2016**
Dep.to de Física Teórica, Universidad Autónoma de Madrid — *Madrid (Spain)*

Junior ESR of the European Union network FP7 ITN INVISIBLES — **Oct. 2012 – Sep. 2015**
Dep.to de Física Teórica, Universidad Autónoma de Madrid — *Madrid (Spain)*

Education

Ph.D. — **Oct. 2012 – Jun. 2016**
Dep.to de Física Teórica, Universidad Autónoma de Madrid — *Madrid (Spain)*
Advisor: Prof. M. Belén Gavela Legazpi

Diploma of Higher Education — **Oct. 2007 – Sep. 2012**
Scuola Galileiana di Studi Superiori — *Padova (Italy)*

Master's degree in Physics (curriculum Theoretical Physics) — **Oct. 2010 – Sep. 2012**
Università degli Studi di Padova — *Padova (Italy)*

Bachelor's degree in Physics — **Oct. 2007 – Jul. 2010**
Università degli Studi di Padova — *Padova (Italy)*

Awards and Grants

- **PRIMA Grant, awarded by the Swiss National Science Foundation** *Call 2020*
  Title: Identifying new physics footprints: Effective Field Theories for the Large Hadron Collider
- **COST Action CA22130, awarded by the COST association** *Call 2022*
  Title: COmprehensive Multiboson Experiment-Theory Action (COMETA)

Service and Coordination activities

- **Chair of the COMETA COST Action** *Sep. 2023 – present*
  `www.cost.eu/actions/CA22130/`
- **Member of the International Advisory Board of MultiBoson Interactions** *2022 – present*
- **Member of the International Organizing Committee of the Higgs Conference** *2021 – present*
- **Convener of the LHC EFT Working Group** *2020 – present*
  `lpcc.web.cern.ch/lhc-eft-wg`
- **WG leader of the CosmicWISPers COST action** *2022 – 2023*
  Co-leader of the working group dedicated to WISP Model Building.
  `www.cost.eu/actions/CA21106/`
- **WG leader of the VBSCan COST action** *2019 – 2021*
  Co-leader of the working group dedicated to theoretical understanding.
  `vbscanaction.web.cern.ch`

Scientific publications

Author of 40+ publications. Full record available on `inspirehep`. 10 most relevant:

1. I. Brivio, T. Corbett, O.J.P. Éboli, M.B. Gavela, M.C. Gonzalez-Garcia, J. Gonzalez-Fraile, L. Merlo, S. Rigolin, *Disentangling a dynamical Higgs*, published in **JHEP 03 (2014) 024**. arXiv: 1311.1823
2. I. Brivio, J. Gonzalez-Fraile, M. C. Gonzalez-Garcia, L. Merlo, *The complete HEFT Lagrangian after the LHC Run I*, published in **Eur. Phys. J. C76 (2016) no.7, 416**. arXiv: 1604.06801
3. I. Brivio, B. Gavela, L. Merlo, K. Mimasu, J. M. No, R. del Rey, V. Sanz, *ALPs Effective Field Theory and Collider Signatures*. published in **Eur.Phys.J. C77 (2017) no.8, 572**. arXiv: 1701.05379
4. I. Brivio, M. Trott, *Scheming in the SMEFT... and a reparameterization invariance!*. Published in **JHEP 07 (2017) 148**. Addendum: **JHEP 05 (2018) 136**. arXiv: 1701.06424
5. I. Brivio, M. Trott, *Radiatively Generating the Higgs Potential and Electroweak Scale via the Seesaw Mechanism*. Published in **PRL 119, 141801**. arXiv: 1703.10924
6. I. Brivio, M. Trott, *The Standard Model as an Effective Field Theory*, published in **Phys. Rept. 793 (2019) 1**. arXiv: 1706.08945
7. I. Brivio, Y. Jiang, M. Trott, *The SMEFTsim package, theory and tools*. Published in **JHEP 12 (2017) 070**. arXiv: 1709.06492
8. I. Brivio, S. Bruggisser, F. Maltoni, R. Moutafis, T. Plehn, E. Vryonidou, S. Westhoff, C. Zhang, *O new physics, where art thou? A global search in the top sector*. Published in **JHEP 02 (2020) 131**. arXiv: 1910.03606.
9. I. Brivio, *SMEFTsim 3.0 – a practical guide*. Published in **JHEP 04 (2021) 073**. arXiv: 2012.11343
10. M. Alminawi, I. Brivio, J. Davighi, *Jet bundle geometry of scalar field theories*. arXiv: 2308.00017

International Schools and Conferences

Organization

- **Invisibles school and workshop 2024** *Bologna (Italy), 24-28 June 2024*
  Local organizing committee
- **EPS 2023** *Hamburg (Germany), 20-25 Aug 2023*
  Convener of Higgs Physics session
- **Higgs 2022** *Pisa (Italy), 7-11 Nov. 2022*
  Program Committee and International Organizing Committee
- **Higgs 2020** *26-20 October 2020*
  Convener of EFT session
- **CRC Workshop on Standard Model Effective Theory** *Heidelberg (Germany), 11-12 July 2019*
  Local organizing committee
- **IFAE 2018** *Milano (Italy), 4-6 April 2018*
  Convener of Intensity Frontier session
- **Invisibles school 2015 and Invisibles15 workshop** *Madrid (Spain), 15-26 June 2015*
  Local organizing committee.

- **Meetings of the COMETA COST Action** *2024 – present*
  1st COMETA Genreal Meeeting - Izmir, Feb 2024
  Effective Field Theory in multiboson production - Padova, June 2024
- **Meetings of the LHC EFT Working Group** *2020 – present*
  4 general meetings, 4 topical meetings
- **HEFT workshop series** *2018 – present*
  International organizing committee for the editions 2018, 2019, 2020, 2021
  Chair of Local Organisation and Program Committees for 2024 edition
- **Meetings of the VBSCan COST Action** *2018 – 2021*
  Organising committee of *Effective Field Theory in Polarised VBS* - Sept. 2020
  Scientific committee of *BSM models in Vector Boson Scattering processes* - Lisbon, Dec. 2019
  Organising committee of *Winter 2021 topical meeting on VBS: VBS at Snowmass* - Jan 2021
  Organising committee of *Advanced VBS Training School* - Milano, Sept. 2021

Talks and posters

Over 50 plenary talks, parallel talks and poster presentations at international conferences, meetings and workshops. 10 most significant in the last 3 years:

1. **3rd CERN Baltic Conference (CBC)** *Riga (Latvia), 10 October 2023*
   Invited keynote talk: Hunting new-physics footprints: the SMEFT program for the LHC
2. **Les Rencontres de Physique de la Vallée d'Aoste** *La Thuile (Italy), 5-11 March 2023*
   Invited talk: LHC constraints on the SM Effective Field Theory
3. **SMEFT-Tools 2022** *Zurich (Switzerland), 14-16 Sep. 2022*
   Invited talk: Monte Carlo SMEFT predictions for the LHC
4. **Multi-Boson Interactions 2022** *22-25 Aug. 2022*
   Invited talk: ALP signals in diboson and VBS
5. **FLASY 2022** *Lisbon (Portugal), 27 Jun. - 1 Jul. 2022*

Invited plenary talk: Flavor symmetries in the SMEFT

6. **HEFT 2022** *Granada (Spain), 14-17 June 2022*
   Invited opening talk: The hunt for non-resonant signals of new physics at the LHC
7. **Higgs 2021** *21 October 2021*
   Invited talk: EFT tools and global fits
8. **TOP 2021** *15 September 2021*
   Invited talk: Theoretical challenges and issues in SMEFT fits
9. **Planck 2021** *29-30 June 2021*
   Plenary talk: The SMEFT program at the LHC
10. **LHCP 2021** *7-11 June 2021*
    Parallel talk: SMEFT predictions for the LHC

Lectures at training schools

- **Theory Challenges in the Precision Era of the LHC – Training Week** *GGI, 25-29 Sep. 2023*
  Course: SMEFT predictions for the LHC
- **SMEFT'2022 summer school** *Siegen (Germany), 11-16 July 2022*
  Course: Precision Electroweak Physics in the SMEFT
- **PREFIT School** *DESY Hamburg (Germany), 2-13 March 2020*
  Courses: EFT UFO Hands-On, Madgraph and parton shower Hands-On, SMEFT Hands-On.

Seminars and visits

40+ invited seminars at Universities and research institutions. 10 most significant in the last 2 years:

1. **CERN: BSM forum series** *CERN (Switzerland), 18 April 2024*
   Invited seminar: SMEFT and HEFT with jet bundle geometry
2. **MMPG Munich** *Munich (Germany), 02 February 2024*
   Invited seminar: SMEFT vs HEFT for new physics searches at the LHC
3. **RTG Colloquium Aachen** *Aachen (Germany), 11 July 2023*
   Invited seminar: Hunting New Physics Footprints: EFT interpretations of LHC data
4. **Zurich Physics Colloquium** *Zurich (Switzerland), 1 March 2023*
   Invited seminar: Hunting New Physics Footprints at the Large Hadron Collider
5. **Laboratori Nazionali di Frascati** *Frascati (Italy), 22 February 2023*
   Invited seminar: The hunt for non-resonant signals of new physics at the LHC
6. **CERN Collider Cross Talk** *CERN, 19 January 2023*
   Invited talk: "$W\gamma$ scattering as a probe for quartic gauge couplings", with Andrew M. Levin
7. **Brookhaven** *8 December 2022*
   Invited seminar: The hunt for non-resonant signals of new physics at the LHC
8. **Cambridge DAMTP** *Cambridge (UK), 14 October 2022*
   Invited seminar: The hunt for non-resonant signals of new physics at the LHC
9. **Uni. Vienna** *10 May 2022*
   Invited seminar: The SMEFT program at the LHC
10. **All Things EFT - International seminar series** *23 March 2022*
    Invited seminar: ALPs Effective Theory: probes and LHC probes

Curriculum Vitae

Dott.ssa Alessandra Gnecchi

Esperienza di Ricerca

11/2022	Ricercatore di III livello, INFN, Sezione di Padova.
10/2020 - 11/2022	Ricercatore Senior, *Max-Planck-Institut für Physik*, Monaco di Baviera (DE)
04/2017 - 03/2020	Fellow della divisione teorica del *CERN*, Ginevra (CH) (nel periodo 04/2017-02/2019 su fondi di una borsa "Marie Skłodowska-Curie" del programma Horizon2020 dello European Research Council)
10/2014 - 03/2017	Postdoctoral fellowship, *KU Leuven* (BE)
10/2012 - 09/2014	Ricercatore Post-doc, *Utrecht University* (NL)
02 - 09/2012	Assegno di Ricerca, *Padua University* (IT)

Educazione

01/2009 - 02/2012	*Università di Padova*, Dottorato di ricerca in Fisica Supervisore: Prof. Gianguido Dall'Agata. Tesi: "Ungauged and gauged Supergravity Black Holes: results on U-duality"
09/2006 - 07/2008	*Università di Pisa*, Laurea Specialistica in Fisica Teorica, voto finale 110/110 Cum Laude. Supervisore: Prof. Sergio Ferrara (CERN, Geneva CH)
09/2003 - 06/2006	*Università di Pisa*, Laurea Triennale in Fisica, voto finale 110/110 Cum Laude.

– Pubblicazioni –

ORCID number: 0000-0002-4925-8008, *https://orcid.org/0000-0002-4925-8008*

[1] N. Cribiori, **A. Gnecchi**, D. Lüst, M. Scalisi, *"On the correspondence between black holes, domain walls and fluxes"*, JHEP 05 (2023), 033, arXiv:2302.03054 [hep-th].
10.1007/JHEP05(2023)033

[2] S. Demulder, **A. Gnecchi**, I. Lavdas D. Lüst, *Islands and Light Gravitons in type IIB String Theory*, JHEP 02 (2023) 016, arXiv:2204.03669 [hep-th].
10.1007/JHEP02(2023)016

[3] N. Cribiori, M. Dierigl, **A. Gnecchi**, D. Lüst, M. Scalisi, *"Large and Small Non-extremal Black Holes, Thermodynamic Dualities, and the Swampland"*, JHEP 10 (2022) 093, arXiv:2202.04657 [hep-th].
10.1007/JHEP10(2022)093

[4] A. Amariti, **A. Gnecchi**, *"τ_{RR} minimization in presence of hypermultiplets"*, JHEP 03 (2022), 166, arXiv:2107.01195 [hep-th].
10.1007/JHEP03(2022)166.

[5] F. Apruzzi, G. B. de Luca, **A. Gnecchi**, G. Lo Monaco, A. Tomasiello, *"On AdS_7 stability"*, JHEP 07 (2020) 033, arXiv:1912.13491 [hep-th].
10.1007/JHEP07(2020)033

[6] G. B. de Luca, **A. Gnecchi**, G. Lo Monaco, A. Tomasiello, *"Holographic duals of 6d RG flows"*, JHEP03 (2019) 035 , arXiv:1810.10013 [hep-th].
10.1007/JHEP03(2019)035

[7] A. Bzowski, **A. Gnecchi**, T. Hertog, "Interactions resolve state-dependence in a toy-model of AdS black holes", JHEP06 (2018) 167, arXiv:1802.02580 [hep-th].
10.1007/JHEP06(2018)167

[8] **A. Gnecchi**, U. Gursoy, O. Papadoulaki, C. Toldo, "A magnetically induced quantum critical point in holography", JHEP 09 (2016) 090, arXiv:1604.04221 [hep-th].
10.1007/JHEP09(2016)090

[9] A. Amariti, **A. Gnecchi**, *"3D τ_{RR}-minimization in AdS_4 gauged supergravity"*, JHEP07 (2016) 006, arXiv:1511.08214 [hep-th].
10.1007/JHEP07(2016)006

[10] N. Gaddam, **A. Gnecchi**, S. Vandoren and O. Varela, *"Rholography, Black Holes and Scherk-Schwarz"*, JHEP06, 058 (2015), arXiv:1412.7325 [hep-th].
10.1007/JHEP06(2015)058

[11] **A. Gnecchi**, C. Toldo, *"First order flow for non-extremal AdS black holes and mass from holographic renormalization"*, JHEP10, 075 (2014), arXiv:1406.0666 [hep-th].
10.1007/JHEP10(2014)075

[12] **A. Gnecchi**, N. Halmagyi, "*Supersymmetric Black Holes in AdS_4 from Very Special Geometry*", JHEP04, 173 (2014), arXiv:1312.2766 [hep-th].
10.1007/JHEP04(2014)173

[13] **A. Gnecchi**, K. Hristov, D. Klemm, C. Toldo, O. Vaughan. "*Rotating black holes in 4d gauged supergravity*", JHEP01, 127 (2014), arXiv:1311.1795 [hep-th].
10.1007/JHEP01(2014)127

[14] **A. Gnecchi**, C. Toldo. " *On the non-BPS first order flow in N=2 U(1)-gauged Supergravity*", JHEP03, 088 (2013), arXiv:1211.1966 [hep-th].
10.1007/JHEP03(2013)088

[15] A. Ceresole, S. Ferrara, **A. Gnecchi**, A. Marrani, "*d-Geometries Revisited*",
JHEP02, 059 (2013), arXiv:1210.5983 [hep-th].
10.1007/JHEP02(2013)059

[16] G. Dall'Agata, **A. Gnecchi**, *"Flow equations and attractors for black holes in N=2 U(1) gauged supergravity"*, JHEP03, 037 (2011), arXiv:1012.3756 [hep-th].
10.1007/JHEP03(2011)037

[17] A.Ceresole, S.Ferrara and **A.Gnecchi**, *"5d/4d U-dualities and N=8 black holes"*, Phys. Rev. D 80, 125033 (2009), arXiv:0908.1069 [hep-th].
10.1103/PhysRevD.80.125033

[18] A.Ceresole, S.Ferrara, **A.Gnecchi** and A.Marrani, *"More on N=8 Attractors"*, Phys. Rev. D 80 (2009) 045020, arXiv:0904.4506 [hep-th].
10.1103/PhysRevD.80.045020

[19] S. Ferrara, **A. Gnecchi**, A. Marrani, *"d=4 Attractors, Effective Horizon Radius and Fake Supergravity"*, Phys. Rev. D 78, (2008) 065003, arXiv:0806.3196 [hep-th].
10.1103/PhysRevD.78.065003

Pubblicazioni divulgative

- Voce enciclopedica: "*Gravità quantistica*" nella *X Appendice dell'Enciclopedia Italiana di Lettere, Scienze e Arti*, già *Parole del XXI Secolo*, pubblicato da "Istituto della Enciclopedia Italiana Treccani" 2020, ISBN 978-88-12-00876-6.
- e-book: la stessa voce "*Gravità quantistica*" è anche stata selezionata per la pubblicazione in formato e-book nella collana *Echi*, (October 2021, ISBN:978-88-12-00960-2) disponibile online www.treccanilibri.it/catalogo/gravita-quantistica/

Proceedings

- A. Gnecchi, *"Rholography, black holes and Scherk-Schwarz"*, Proceedings of Fourteenth Marcel Grossmann Meeting - MG14, University of Rome "La Sapienza", July 12-18, 2015. Ed. by M. Bianchi, R. T Jantzen, R. Ruffini. World Scientific, Singapore, 2016.
- A. Gnecchi, "*Duality invariance for black holes in N=2 gauged Supergravity*", "Proceedings of 12th Hellenic School and Workshops on Elementary Particle Physics and Gravity", Proceedings of Science, Corfu2012 (2013) 116.
- A. Gnecchi, *"Fake Supergravity and Black Hole Evolution"*, "Proceedings of the International School of Subnuclear Physics", World Scientific Publishing Co., Subnucl. Ser. 46 (2011) 619-629.

– Insegnamento –

02/2024 - Corso di dottorato "String Theory part II" 12 ore, Università di Padova

2019/2020 & 2020/2021 - **Professore a contratto** Università Cattolica, Brescia
Titolare del corso per la laurea triennale in fisica: "Fisica dei Nuclei e delle Particelle".

Altri insegnamenti:

Teaching assistant, KU Leuven

2014 e 2016	Quantum Field Theory I
2014 e 2015	Quantum Mechanics II

Tutor, Università di Padova

2010-2012	Physics I& II, Algebra for Computer Science, Statistical Physics for Molec. Biology

– Referee –

Referee per le riviste scientifiche: JHEP, European Physics Journal C., MDPI Universe.

– Incarichi Istituzionali –

Deputy Gender Equality Officer, Maggio 2021 - Novembre 2022. Max Planck Institute for Physics, Munich, Germany.

– Attività Scientifiche –

23-28 June 2024	Co-Organizzatrice della conferenza internazionale String Phenomenology 2024, Padova.
21-22 Sept 2023	Co-Organizzatrice del workshop Supergravity 2023, Padova.
21-25 Aug 2023	Convener della sessione "Quantum Fields and Strings" della conferenza *EPS-HEP*, Universität Hamburg e DESY, Hamburg, Germany.
21-24 Sept 2021	Convener della sessione parallela "Strings and Mathematical Physics" del *2021 DESY Theory Workshop* al laboratorio DESY, Hamburg, Germany.
17-19 March 2021	Organizzatrice di Online Workshop on Quantum Gravity, Holography and Quantum Information, formalmente organizzato dal Max-Planck-Institut für Physik and Ludwig-Maximilians-Universität, Arnold Sommerfeld Cenetr, München.
18-22 March 2019	Co-Organizzatrice del CERN TH-Institute "Quantum gravity and quantum information", insieme a Raphael Bousso (UC Berkeley) e Steve Giddings (UCSB and CERN).
20-31 Aug 2018	Co-Organizzatrice del CERN TH Institute e workshop "Black holes, quantum information and spacetime reconstruction", CERN, insieme a Kyriakos Papadodimas (CERN), Monica Guica (CEA Saclay), Andrea Puhm (Ecole Polytéchnique).
1-3 Sept 2014	Organizzatrice del workshop "BOBS Black Objects Beyond Supersymmetry", Utrecht.

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Fellowships

2016	EU Council Individual Fellowship, H2020 Program: H2020-MSCA-IF-2015 Marie Skłodowska-Curie action, titolo "GaugedBH", grant n. 702548
2009	Vincitrice di una Borsa di Dottorato della Fondazione "CARIPARO" per dottorato all'Università di Padova 2009-2011 a tema "Supergravity and black holes".

Awards

2009	Premio "FRANCO BASSANI" della SIF, Società Italiana di Fisica (Euro 1000).

– Recent Talks –

03/2024	"A low energy perspective on Quantum Gravity" Online Seminar for *Amplitudes' Lounge on Womens' day, 2024*, Padua University.
01/2024	"A low energy perspective on Quantum Gravity" Online Seminar for University of Chile, Valparaiso.
06/2023	"Meet the Jury" seminar, 21 June 2023, KUL, Leuven, Belgium.
05/2023	PRIN Meeting Scuola Normale Superiore, "Swampland constraints & black hole entropy in N=2 supergravity"
06/2022	Würzburg Seminar on Quantum Field Theory and Gravity, "Islands and light gravitons in IIB String Theory"

05/2022	Perimeter Institute QFStrings Seminars, "Islands and light gravitons in IIB String Theory" - *Online seminar*
05/2022	London-Oldenburg Relativity Seminar Series, "Large and Small Non-extremal Black Holes, Thermodynamic Dualities, and the Swampland" - *Online seminar*
03/2022	String Phenomenology seminar series, "Large and Small Non-extremal Black Holes, Thermodynamic Dualities, and the Swampland" - *Online seminar.*
09/2021	University of Tennessee at Knoxville (USA), talk ''Low energy perspectives on quantum gravity" - *Online seminar.*

– Conference and Workshops: presentazioni recenti –

- Workshop on Holography and the Swampland, 12-19 September 2023, Corfu, Greece. Talk "Extremal surfaces and graviton masses in type IIB String Theory".
- Mini-Workshop *Gravity and Black Holes - Moving beyond the paradigm*, 11-12 April 2023, Max Planck Institut for Physics, Munich, Germany. Talk "A road to the UV properties of gravity and back".
- Review speaker for the *SCGSC 2022 - Strings, Cosmology and Gravity Student Conference*, May 2021, Amsterdam, The Netherlands.
- *Geometry, Strings and the Swampland* Workshop, November 2021, Ringberg Castle, Germany. Talk ''A playground for black hole evaporation from type IIB string theory".

– Attività di Divulgazione/Outreach Recenti –

02/2024	Lezioni "Relatività e Meccanica Quantistica" per studenti delle scuole superiori del *Liceo Giorgio Dal Piaz*, Feltre (BL), parte del programma *Masterclass* organizzato dal Dipartimento di Fisica e Astronomia e INFN, Padova.
03/2023	Lezione "CERN e la fisica fondamentale", per studenti delle scuole superiori del *Liceo Scientifico Copernico*, Brescia, su invito del comitato organizzativo delle giornate *Copernicane* di autogestione.
02/2019	''International day of women in science'' initiative - Tre lezioni sul CERN a classi di scuola elementare, studenti tra i 9 e 10 anni, nella zona di Ginevra, in Francese.
08/2018	CERN International High School Teacher Program 2018, Lezione "A glimpse into theory", anche 07/2018.
11/2023	Science Week dell'Università di Padova - attività *Rustle* per classi di studenti di 12 anni, 15-16/11/2023.
09/2023	Giornata Science4All dell'Università di Padova - supporto alla registrazione delle attività di escape room e presentazione attività *Rustle* al gazebo.
01/2023	Membro del panel all'evento *doc.schools meet art* della Universität Wien: *Science and Art - a desirable symbiosis?*, discussione tra scienziati e artisti.
02/2022	Co-produzione del video per l'International Day of Women and Girls in Science, "Women in Physics" (www.youtube.com/watch?v=sWc4OiuCq5I), distribuito dal Max Planck Institute for Physics, Monaco di Baviera (DE), già proposto per il 2021 e realizzato: Link to video, distribuito dal Max Planck Institute for Physics, Monaco di Baviera (DE).

Andrea Tesi

Curriculum vitae

Personal Information

Family Name, First Name: Tesi, Andrea

Employment

2017 – today **Researcher (tenured)**, *Istituto Nazionale di Fisica Nucleare (INFN)*, Florence, Ricercatore di III livello

2014 – 2017 **Postdoctoral Fellow**, *University of Chicago*, Chicago, IL, US

Education

2011 – 2014 **Ph.D. in Physics**, *Scuola Normale Superiore*, Pisa, 70/70 cum laude

2008 – 2011 **Laurea Specialistica (MSc)**, *Università di Firenze*, Florence, 110/110 cum laude

2005 – 2008 **Laurea (BSc)**, *Università di Firenze*, Florence, 110/110 cum laude

Institutional Responsabilty

2018 – today **Adjunct Professor**, *Università di Firenze*, Firenze, [docente a contratto]

2017 – today **Research Associate**, *INFN*, Firenze

Awards, Fellowships & Qualifications

2023 **Abilitazione Scientifica Nazionale**, *Seconda Fascia*, 02/A2, since 08 JUN 2023

2014 – 2017 **Reinhard & Mafalda Oehme Fellowship**, *University of Chicago*

2016 **Premio Sergio Fubini 2015**, *INFN*

2011 – 2014 **PhD fellowship**, *Scuola Normale Superiore*

Scientific output and bibliometrics

Brief summary of scientific production (up to April 22, 2024)

- 36 published articles (in 02/A2)
- more than 4,800 citations (5,600 from all citable contributions), h-index: 24 (27) [Source: INSPIRE]
- more than 2000 citations, h-index: 20 [Source: Scopus]
- more than 2300 citations, h-index: 20 [Source: WoS]
- more than forty invited seminars at international institutes and workshops

Research Activity and Scientific Publications

Papers on peer-reviewed international journals

1. M. Redi and A. Tesi, "Neutrinos, Dark Matter and Higgs Vacua in Parity Solutions of the strong CP problem," J. High Energ. Phys. 2023, 211 (2023)
2. C. Accettura, D. Adams, R. Agarwal, C. Ahdida, C. Aimè, N. Amapane, D. Amorim, P. Andreetto, F. Anulli and R. Appleby, *et al.*, "Towards a muon collider," Eur. Phys. J. C **83** (2023) no.9, 864
3. M. Redi and A. Tesi, *"The meso-inflationary QCD axion"*, Phys.Rev.D 107 (2023) 9, 095032
4. M. Redi and A. Tesi, *"Jump Starting the dark sector with a phase transition"*, JHEP 01 (2023) 085
5. M. Redi and A. Tesi, *"Dark Photon Dark Matter without Stueckelberg mass"*, JHEP 10 (2022) 167
6. R. Garani, M. Redi and A. Tesi, *"Dark Matter self-interactions in the matter power spectrum"*, JCAP07 (2022) 07, 012
7. M. Redi and A. Tesi, *"General Freeze-in and Freeze-out"*, JHEP 12 (2021) 060
8. R. Garani, M. Redi and A. Tesi, *"Dark QCD matters "*, JHEP 12 (2021) 139
9. H. Al Ali et al., *"The Muon Smasher's Guide"*, Rept.Prog.Phys. 85 (2022) 8, 084201
10. M. Redi, A. Tesi and H. Tillim, *"Gravitational Production of a Conformal Dark Sector"*, JHEP 05 (2021) 010
11. R. Mahbubani, M. Redi and A. Tesi, *"Dark Nucleosynthesis: Cross-sections and Astrophysical Signals"*, JCAP 02 (2021) 039
12. L. Delle Rose, G. Panico, M. Redi and A. Tesi *"Gravitational Waves from Supercool Axions"*, JHEP 04 (2020) 025
13. R. Mahbubani, M. Redi and A. Tesi *"Indirect detection of composite asymmetric dark matter"*, Phys.Rev.D 101 (2020) 10, 103037
14. M. Redi and A. Tesi *"Cosmological production of Dark Nuclei"*, JHEP 1904 (2019) 108
15. A. Abada et al (FCC collaboration), *"FCC Physics Opportunities : Future Circular Collider Conceptual Design Report Volume 4"*, Eur.Phys.J.ST 228 (2019) 5, 1109-1382
16. A. Abada et al (FCC collaboration), *"FCC Physics Opportunities : Future Circular Collider Conceptual Design Report Volume 3"*, Eur.Phys.J.ST 228 (2019) 4, 755-1107
17. A. Abada et al (FCC collaboration), *"FCC Physics Opportunities : Future Circular Collider Conceptual Design Report Volume 2"*, Eur.Phys.J.ST 228 (2019) 2, 261-623
18. A. Abada et al (FCC collaboration), *"FCC Physics Opportunities : Future Circular Collider Conceptual Design Report Volume 1"*, Eur.Phys.J.C 79 (2019) 6, 474
19. D. Buttazzo, D. Redigolo, F. Sala, A. Tesi, *"Fusing vectors into scalars at High Energy Lepton colliders"*, JHEP 1811 (2018) 144
20. D. Barducci, S. De Curtis, M. Redi, A. Tesi, *"An almost elementary Higgs: theory and practice"*, JHEP 1808 (2018) 017
21. R. Barbieri, A. Tesi *"B-decay anomalies in Pati-Salam SU(4)"*, Eur.Phys.J. C78 (2018)3,193
22. A. Long, A. Tesi and L.T. Wang, *"Baryogenesis at a lepton-number breaking phase transition"*, JHEP 1710 (2017) 095
23. M. Farina, F. Rompineve, D. Pappadopulo and A. Tesi, *"The photophilic QCD axion"*, JHEP 1701 (2017) 095
24. F. Sannino, A. Strumia, A. Tesi and E. Vigiani, *"Fundamental partial compositeness,"* JHEP 1611, 029 (2016)
25. M. Redi, A. Strumia, A. Tesi and E. Vigiani, *"Di-photon resonance and Dark Matter as heavy pions,"* JHEP 1605, 078 (2016)
26. M. Low, A. Tesi and L. T. Wang, *"A pseudoscalar decaying to photon pairs in the early LHC Run 2 data,"* JHEP 1603, 108 (2016)
27. M. Low, A. Tesi and L. T. Wang, *"Composite spin-1 resonances at the LHC,"* Phys. Rev. D 92, no. 8, 085019 (2015)

28. D. Buttazzo, F. Sala and A. Tesi, *"Singlet-like Higgs bosons at present and future colliders,"* JHEP 1511, 158 (2015)
29. M. Low, A. Tesi and L. T. Wang, *"Twin Higgs mechanism and a composite Higgs boson,"* Phys. Rev. D 91, 095012 (2015)
30. R. Barbieri and A. Tesi, *"Higgs couplings and electroweak observables: a comparison of precision tests,"* Phys. Rev. D 89, no. 5, 055019 (2014)
31. R. Barbieri, D. Buttazzo, K. Kannike, F. Sala and A. Tesi, *"One or more Higgs bosons?"*, Phys. Rev. D 88 (2013) 055011
32. R. Barbieri, D. Buttazzo, K. Kannike, F. Sala and A. Tesi, *"Exploring the Higgs sector of a most natural NMSSM"*, Phys. Rev. D 87 (2013) 115018
33. R. Barbieri, D. Buttazzo, F. Sala, D. M. Straub and A. Tesi, *"A 125 GeV composite Higgs boson versus flavour and electroweak precision tests"*, JHEP 1305 (2013) 069
34. G. Panico, M. Redi, A. Tesi and A. Wulzer, *"On the Tuning and the Mass of the Composite Higgs"*, JHEP 1303 (2013) 051
35. M. Redi and A. Tesi, *"Implications of a Light Higgs in Composite Models"*, JHEP 1210 (2012) 166
36. S. De Curtis, M. Redi and A. Tesi, *"The 4D Composite Higgs"*, JHEP 1204 (2012) 042

Reports

r1. J. de Blas et al., *"The CLIC. potential for new physics"*, CERN Yellow Rep.Monogr. 3 (2018)
r2. R. Contino et al., *"Physics at a 100 TeV pp collider: Higgs and EW symmetry breaking studies"*, CERN Yellow Rep. (2017) 3, 255-440
r3. A. Andreazza et al., *"What Next: White Paper of the INFN-CSN1"*, Frascati Phys. Ser. 60 (2015) 1.
r4. X. Cid Vidal et al, "Beyond the Standard Model physics at the HL-LHC and HE-LHC", CERN Yellow Report. CERN Yellow Rep.Monogr. 7 (2019) 585-865

Conference Proceedings

c1. A. Tesi, *"Higgs and Electroweak precision data"*, contribution to the proceedings of "26th Rencontres des Blois - particle physics and cosmology" , 2014

Other peer-reviewed publications

o1. A. Fasano, M. Primicerio, A. Tesi *"A mathematical model for spaghetti cooking with free boundaries"* , Networks and Heterogeneous Media, 2011, 6(1): 37-60.

Working groups

INFN "Iniziativa Specifica"

2021 – today **"Theoretical Particle Physics and Cosmology"**, *[quota 100%]*
INFN, sezione di Firenze.

2017 – 2021 **"HEPCUBE"**, *[quota 100%]*
INFN, sezione di Firenze.

International Working Groups

- **Participation.** *"What Next" initiative* of the Istituto Nazionale di Fisica Nucleare. Contribution to the report [r3]. Period: from 17-03-2014 to 31-01-2015
- **Participation.** *"FCC-hh physics programm", initiative* of CERN. Contribution to the report [r2]. Period: from 01-09-2015 to 30-06-2016
- **Participation.** *"Working Group 3: Beyond the Standard Model physics at the HL-LHC and HE-LHC" initiative* of CERN. Contribution to the report [r4]. Period: from 01-06-2018 to 31-12-2018.

- **Participation.** *"CLIC collaboration"*. Contribution to the report [r1]. Period: from 01-06-2018 to 01-12-2018.

Grants

- **PI of INFN project "STRONG"** (20Keuro).
  Grant used to co-fund "assegni di ricerca" for Dr. Luigi Delle Rose, and Dr. Chen Zhang.
  INFN Call N. 18221/2016 E N. 18226/2016. Period: from 01-07-2018 to 31-12-2021.
- **Participant** to the PRIN project PRIN 2017L5W2PT.
  Grant used to co-fund "assegno di ricerca" for Dr. Chen Zhang.
  INFN Call n. 21821/2020 Period: from 01-01-2017.

Mentoring and Supervision

Postdoctoral fellow at the INFN Florence

-

Phd Students at the University of Florence

-

Master Students (Laurea Magistrale) at the University of Florence

-
-
-
-

Bachelor Students (Laurea Triennale) at the University of Florence

-

Teaching Activity

My teaching activity has been done at the University of Florence as adjucnt professor (docente a contratto). The details are listed here below:

University of Florence

Fall 2023 **Theories of the Early Universe**, *(24 hours)*, Master's degree in Physics
Link: `https://www.unifi.it/index.php?module=ofform2&mode=1&cmd=3&AA=2023&afId=678298`

Spring 2023 **Cosmological tests of dark sectors**, *(8 hours)*, Ph.D. in Physics
Link: `https://www.fisica.unifi.it/upload/sub/dottorato/2022_11--corsi_dottorato_2023.pdf`

Spring 2023 **Axions**, *(8 hours)*, Ph.D. in Physics
Link: https://www.fisica.unifi.it/upload/sub/dottorato/2022_11--corsi_dottorato_2023.pdf

Fall 2022 **Theories of the Early Universe**, *(24 hours)*, Master's degree in Physics
Link: https://www.unifi.it/index.php?module=ofform2&mode=1&cmd=3&AA=2022&afId=628383

Spring 2022 **Dark Sectors: cosmology and phenomenology**, *(16 hours)*, Ph.D. in Physics

Fall 2021 **Theories of the Early Universe**, *(24 hours)*, Master's degree in Physics
Link: https://www.unifi.it/p-ins2-2021-590792-0.html

Spring 2021 **Theories of the Early Universe**, *(24 hours)*, Master's degree in Physics
Link: https://www.unifi.it/index.php?module=ofform2&mode=1&cmd=3&AA=2020&afId=568232&lang=0

Spring 2020 **Theories of the Early Universe**, *(24 hours)*, Master's degree in Physics
Link: https://www.unifi.it/index.php?module=ofform2&mode=1&cmd=3&AA=2019&afId=543379&lang=0

Spring 2019 **Theories of the Early Universe**, *(32 hours)*, Master's degree in Physics
Link: https://www.unifi.it/index.php?module=ofform2&mode=1&cmd=3&AA=2018&afId=509200

Spring 2018 **Axions**, *(10 hours)*, Ph.D. in Physics
Link: https://www.fisica.unifi.it/upload/sub/ricerca/dottorato/Corsi%20XXXIII%20ciclo%20.2.pdf

Organization of Scientific events

International Conferences and Workshops

2019 ***New frontiers in the search for Dark Matter*** , *GGI Workshop in Florence*, [local organizer]

2018 ***Beyond the Standard Model: where do we go from here?***, *GGI Workshop in Florence*, [organizer]

2015 ***HEFT2015 - Higgs Effective Field Theory Workshop***, *Chicago (US)*, [organizer]

International Schools

2024 ***GGI Lectures on the Theory of Fundamental Interactions***, *GGI, Florence, [organizer]*

Seminar series

2020-2022 ***GGI Tea Breaks'***, online international seminar series (hosted by GGI), [organizer]

2020-2021 ***Newton 1665***, online international seminar series, [organizer]

Service Work

Internal service at the INFN Florence

2019-2021 **"Commissione Assegni"**, *Committee member (theory) for selection of postdocs*, INFN Firenze, Period: from 15/05/2019 to 15/05/2021

2018 **"Circolo d'ascolto"**, *Committee member*

External service

- Referee for PhD thesis: Rupert Coy (U. of Montpellier, 2019); Elena Venturini (SISSA, 2019).

- Convener for conferences: EPS 2015 22-29 July 2015, Vienna (session: Higgs / New physics:)

Journal Referee

- Referee for: JHEP, EPJC, PLB

Editorial Board

- 2023-present: Review Editor for Frontiers in Physics – High-Energy and Astroparticle Physics

Outreach

2022-2024 **"Art&Science across Italy" - IV edition**
co-organizer for Florence of the activities of Art&Science, INFN initiative

28/04/2023 **"Art&Science across Italy"**, *"La materia oscura"*, Presentation to high-school classes within the program of "Art&Science"

27/04/2023 **"Art&Science across Italy"**, *"Breve storia dell'Universo"*, Presentation to high-school classes within the program of "Art&Science"

31/01/2023 **"Liceo Scientifico Rodolico"**, *"Le Frontiere della fisica: l'energia oscura"*, Presentation to high-school students

24/01/2023 **"Liceo Scientifico Rodolico"**, *"Le Frontiere della fisica: la materia oscura"*, Presentation to high-school students

28/09/2018 **"BRIGHT"**, *"Il primo secondo dell'Universo, 13.8 miliardi di anni fa."*, Short presentation during the "Notte dei ricercatori"

Outreach Publications

- S. De Curtis, A. Tesi *"Le fantastiche quattro"* , Asimmetrie 28, DOI: 10.23801/asimmetrie.2020.28.7

Angelo **Esposito**

Curriculum Vitae

Education

Columbia University — *New York, USA*
Ph.D. in Theoretical Physics — *2013 – 2018*
Thesis title: Low Energy Physics for the High Energy Physicist; Advisor: Prof. A. Nicolis

Sapienza University — *Rome, Italy*
Laurea Specialistica in Theoretical Physics, *Cum Laude* — *2011 – 2013*
Thesis title: A Mechanism for Hadron Molecule Production in $pp(\bar{p})$ Collisions; Advisor: Prof. A. D. Polosa

Sapienza University — *Rome, Italy*
Laurea in Physics, *Cum Laude* — *2008 – 2011*
Thesis title: Group Theory and Symmetries in Physics; Advisor: Prof. M. Testa

Professional Experience

As of May 22nd 2020, I hold the Italian national scientific habilitation for associate professor (abilitazione scientifica nazionale per professore di seconda fascia).

Sapienza University — *Rome, Italy*
Tenure-track researcher, Physics Department — *Fall 2022 – Present*

Institute for Advanced Study — *Princeton, USA*
Roger Dashen Member, School of Natural Sciences — *Fall 2021 – Fall 2022*

École Polytechnique Fédérale de Lausanne — *Lausanne, Switzerland*
Postdoctoral Research Associate, Theoretical Particle Physics Laboratory — *Fall 2018 – Fall 2021*

Sapienza University — *Rome, Italy*
Visiting Scientist, High Energy Theory Group — *Summer 2018*

Columbia University — *New York, United States*
Instructor, Teaching/Research Assistant — *Fall 2013 – Spring 2018*

Grants & Awards

2023 **Buchalter Cosmology Prize**, for the paper Phys. Rev. D (2022), [arXiv:2209.06228] — *AAS, USA*
2021 ***"Marie Skłodowska-Curie"* Global Fellowship (declined)**, total of 250k € — *Horizon 2020*
2017 ***"Allan M. Sachs"* Teaching Award**, Physics Department at Columbia University — *New York, USA*
2016 ***"Giuliano Preparata"* prize for young graduates**, Italian Physical Society — *Padova, Italy*
2014 ***"Nicola Cabibbo"* diploma for new talents**, International School of Subnuclear Physics — *Erice, Italy*
2013 **ARAP prize for Astroparticle physics**, Roman Society for Astroparticles — *Rome, Italy*

Research

Quantum Field Theory and Effective Field Theories

I study different aspects of **quantum field theory and effective field theories** (EFTs), especially in relation to different **phases of matter**. My collaborators and I have employed EFT techniques for the description of vortices in ultra-cold atom gases, of sound waves in different media, of pseudo-acoustic phonons in 2D materials and of the so-called gapped Goldstones arising, for example, in magnetic materials. I have also studied the connection between the holographic descriptions of superfluids and solids and the corresponding EFTs, as well as the properties of phonons in fluids and solids solely from the behavior of their **scattering amplitudes**.

Main collaborators: N. Arkani-Hamed (IAS), T. Brauner (Stavanger U.), T. Melia (Tokyo IPMU), A. Nicolis (Columbia), R. Penco (Carnegie Mellon), R. Rattazzi (EPFL).

Light Dark Matter

I devoted a large share of my time in applying EFT techniques to the study of **light dark matter and its detectability**. In particular, my collaborators and I have investigated the possibility of detecting sub-MeV dark matter using phonons in superlfuid ^{4}He (for spin-independent interactions), as well as magnons in anti-ferromagnets (for spin-dependent interactions). I have also studied the possibility of extending the sensitivity of seminconductor-based detectors to MeV dark matter using the so-called **Migdal effect**.

Main collaborators: A. Caputo (CERN), R. Essig (Stony Brook U.), F. Piccinini (INFN Pavia), A. D. Polosa (Sapienza), S. Pavaskar (Carnegie Mellon).

Exotic Hadron Spectroscopy

I study several different aspects of the so-called **exotic hadrons**, which are observed resonances that do not fit the standard quarkonium models. My work has been mostly focused on the two main models proposed to explain their nature: the compact tetraquark and the hadron molecule. I have studied different aspects of both of them, ranging from the mechanism explaining their production, to selection rules for their spectrum and possible observables able to decipher their structure as, for example, the effective range of low energy scattering.

Main collaborators: L. Maiani (Sapienza), F. Piccinini (INFN Pavia), A. Pilloni (Messina U.), A. D. Polosa (Sapienza), R. Rattazzi (EPFL).

Large Scale Structures

I am also interested in the connection between the **large scale structures of the Universe and primordial nongaussianities**. My collaborators and I have shown with numerical N-body simulations that it is possible to determine whether the initial inflationary expansion of the Universe was driven by one or more light fields by applying the so-called consistency relations (identities between different statistical correlators) to the distribution of matter in the sky.

Main collaborators: J. C. Hill (Columbia), L. Hui (Columbia), R. Scoccimarro (NYU).

Academic and Organizational Services

Referee

Physical Review Letters, Physical Review Research, Physical Review D, Journal of High Energy Physics, European Physical Journal A, C and Plus

Conferences and workshops organized

High Energy Physics Meets Low Energy Phenomena (link) — *Pollica Summer Workshop, 2022*

Low Energy Challenges for High Energy Physicists 3 (link) — *Perimeter Institute, 2017*

Co-founder and Vice President — *Pollica, Italy*

Pollica Physics Centre — *2022 – Present*

Prof. Mario Martone (King's Coll.), Dr. Chiara Toldo (Harvard) and I founded the Pollica Physics Centre (link). This is an international conference center located in Pollica (Italy), whose goal is that of hosting world's experts on different branches of physics in the beautiful medieval Castello dei Principi Capano. Every year, the Pollica Physics Centre hosts workshops covering a wide range of topics, and all characterized by a tendency towards interdisciplinarity and by a very informal environment, which strongly facilitates discussions and new collaborations. The center is supported by Regione Campania, University of Salerno, University of Naples and INFN.

Co-organizer — *Sapienza*

INFN Rome Seminars — *2022 – present*

Co-organizer — *EPFL*

EPFL High Energy Theory Seminar — *2019 – 2021*

Founder and co-organizer — *Columbia University*

Graduate Student Talk — *2016 – 2017*

This is a bi-weekly social event created with the idea of providing an environment where graduate students can learn about each other's research and socialize to build a stronger community. The events consist of a 30 minutes long talk given by a Ph.D. student to an audience of peers, followed by a happy hour funded by the Physics Department.

Co-founder *Columbia University*

Graduate Student Council *2016*

Together with other fellow Ph.D. students I helped creating a Graduate Students Council. The group is composed by a small number of graduate students and constitutes a more direct link with the department.

Teaching experience

Supervisor of Master thesis

I have so far supervised 1 and co-supervised 6 Master's students. *Fall 2022 – present*

Instructor *Sapienza University*

Quantum Mechanics and Statistical Mechanics *2023 – present*

Instructor *Sapienza University*

Mathematical Methods for Physics *2023 – present*

Assistant *Sapienza University*

Fisica II (Electromagnetism) *Fall 2022*

Travaux Pratique IV *EPFL*

Group Theory and Quantum Field Theory *Fall 2019 – Spring 2021*

Instructor *Columbia University*

Introduction to Experimental Physics Lab *2015 – 2016*

Teaching Assistant *Columbia University*

Quantum Field Theory 2 and 3, Quantum Physics, Mechanics, General Physics Lab, Summer High School Program *2013 – 2018*

Outreach

Co-organizer and teacher *Reading Team, New York*

Reading Team Math Program *2017 – 2018*

Together with Prof. L. Hui and L. Havener, I have helped creating, designing and organizing the Reading Team Math Program (link). The program aims at helping Kindergarten, 1st and 2nd Grade students from low-income families in the Harlem area (New York), who are experiencing early difficulties in math. Thanks to several volunteers the program provides help with a ratio of almost one student per tutor. Preliminary data show that our program is statistically successful in improving the students' math skills.

Teacher *Columbia University, New York*

Physics Show *2013 – 2017*

Once per year, the Physics Department at Columbia University organizes a physics show for young students from public elementary schools in the neighborhood (Harlem and Morningside). The volunteers perform simple but entertaining experiments in front of the students, who are then free to ask as many questions as they wish.

Teacher *Columbia University, New York*

Girls' Science Day *2017*

Once per year, Columbia University hosts the Girls' Science Day (link), a free day-long program for hands-on experiments for middle school girls. Faculty members, postdocs and graduate students participate to the organization and teaching of the activities, which cover many different sciences all over the university campus.

Skills

Programming Languages Mathematica (expert), Fortran (expert), FORM (intermediate), C/C++ (intermediate), ROOT (intermediate)
Italian (native language), English (excellent), French (intermediate)

Invited Talks

ICTP Trieste, Theory Seminar 2024

Scuola Normale Superiore di Pisa, Theory Seminar 2024

University of Southampton, Theory Seminar 2024

University of Genova, NuMass 2024 2024

Karlsruhe Institute of Technology, Light Dark World 2023 2023
University of Padova, Particle Avenues in the Dark Universe Arena (PADUA): Light Dark Sectors 2023
CERN, EuCAPT Symposium 2023
University of Turin, Theory Seminar 2023
Sapienza University, Colloquium 2023
Cygnus, Overview on direct dark matter detection @ collaboration meeting 2022
University of Milano Bicocca, NuMass 2022 2022
Rencontres de Blois, 33rd Rencontres de Blois — Exploring the dark Universe 2022
Simons Center for Geometry and Physics at Stony Brook, Theory Seminar 2022
Institute of Physics of 2 Infinities of Lyon, Double Charm Tetraquark and Other Exotics 2021
University of Bristol, International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy 2021
Universidad Nacional Autónoma de México, HADRON 2021 2021
Weizmann Institute of Science, Physics Seminar 2021
SISSA, Theoretical Particle Physics Seminar 2021
Stavanger University, Theory Seminar 2021
Perimeter Institute, Theory Seminar 2021
Oxford University, Cosmology Seminar 2021
Heidelberg University, Kirchhoff-Institute for Physics Seminar 2020
CERN, ALICE 3: First workshop on physics and detector 2020
Institute of Nuclear Theory at U. Washington, Accessing and Understanding the QCD Spectra Workshop 2020
California Institute of Technology, High Energy Physics Seminar 2020
Tel Aviv University, Pheno Journal Club 2020
Carnegie Mellon University, Theory Seminar 2020
Imperial College London, Theory Seminar 2020
International Center for Theoretical Physics (ICTP), Theory Seminar 2020
European Center for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), Theory Seminar 2020
Universitat Autònoma de Barcelona, IFAE Theory Seminar 2019
Geneva University, Theory Seminar 2019
Sapienza University, Cygnus 2019 — 7th workshop on directional dark matter searches 2019
T. D. Lee Institute, Exotic Hadrons: Theory and Experiment at Lepton and Hadron Colliders 2019
Sapienza University, Joint Rome Seminar 2017
Perimeter Institute, Low Energy Challenges for High Energy Physicists 2 Conference 2016
CERN, Implications of LHCb Measurements and Future Prospects Workshop 2016
Jefferson Lab, Hadron 2015 Conference 2015

References

Prof. Alberto Nicolis

Prof. Lam Hui

Prof. Antonio D. Polosa

Prof. Riccardo Rattazzi

Prof. Roman Scoccimarro

Prof. Riccardo Penco

Personal info

Last name, First name

VALLI, MAURO

Researcher profile

Current position

Permanent Research Staff at INFN Rome – Theory Group at Sapienza, Rome

Previously

Senior Research Scientist at Stony Brook University – C.N. Yang Institute for Theoretical Physics – (Sept 2021 – Aug 2023)

Postdoctoral Fellow at University of California, Irvine – Department of Physics and Astronomy – (Sept 2018 – Aug 2021)

Postdoctoral Researcher at INFN Rome (June 2017 – Aug 2018)

Research visiting

- **Astroparticle and Cosmology group at GRAPPA, Amsterdam** (April 2018)
- **HEP Theory Group at University of California, Riverside** (Nov 2016 – Feb 2017, Sept 2017 – Oct 2017)
- **HEP Theory Group at Sapienza, Rome** (Oct 2016, Mar 2017 – May 2017)
- **Theoretical Particle Physics group at SISSA, Trieste** (June 2012 – July 2012)

Education

- **Ph.D. at SISSA, International School for Advanced Studies** (4 years)
  - **Ph.D. in Astroparticle Physics with honors (summa cum laude)**
  - Sept 19th 2016, Trieste, Italy. Ph.D. advisor: Prof. **Piero Ullio**
  - **Ph.D. thesis:** "A glimpse on DM particles shining through the γ-ray sky"
- **Master of Science in Physics at Sapienza, Rome** (2 years)
  - **110/110 with honors (summa cum laude)** (Jan 2012)
  - M.Sc. thesis: **"CP violation in the charm sector in supersymmetry"**
- **Bachelor of Science in Physics at Sapienza, Rome** (3 years)
  - **110/110 with honors (summa cum laude)** (Nov 2009)
  - B.Sc. thesis: **"Group theory and applications to quantum mechanics"**

Awarded of

- Simons grant as member of the Steering Committee of the Pollica Physics Center, in partnership with the Galileo Galilei Institute (2024 - 2025)
- Simons Bridge Fellowship (2021 - 2023)
- Italian National Scientific Qualification (ASN) for Associate Professor positions in Theoretical Physics of Fundamental Interactions (2020 - 2029)
- UC Postdoctoral Fellowship (2018 - 2021)
- SISSA Ph.D. Fellowship (2012 - 2016)

List of publications

1) *"Gamma-ray sky points to radial gradients in cosmic-ray transport"*, arXiv:1411.7623, **PRD 91 (2015) 8** , with *Daniele Gaggero, Alfredo Urbano, Piero Ullio*

2) *"The gamma-ray and neutrino sky: a consistent picture of Fermi-LAT, Milagro, and IceCube results"*, arXiv:1504.00227, **ApJ Letters 815 (2015) 2**, with *Daniele Gaggero, Dario Grasso, Antonio Marinelli, Alfredo Urbano*

3) *"Towards a realistic astrophysical interpretation of the Galactic center excess"*, arXiv:1507.06129, **JCAP 12 (2015) 12**, with *Daniele Gaggero, Marco Taoso, Alfredo Urbano, Piero Ullio*

4) *"$B \to K^* \ell^+ \ell^-$ decays at large recoil in the Standard Model: a theoretical reappraisal"*, arXiv:1512.07157, **JHEP 06 (2016) 116**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Satoshi Mishima, Ayan Paul, Luca Silvestrini*

5) *"A critical reassessment of particle Dark Matter limits from dwarf satellites"*, arXiv:1603.07721, **JCAP 07 (2016) 07**, with *Piero Ullio*

6) *"On Flavourful Easter eggs for New Physics hunger and LFUV"*, arXiv:1704.05447, **EPJC 77 (2017) 10**, with *Marco Ciuchini, Antonio Coutinho, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

7) *"Dark matter self-interactions from the internal dynamics of dwarf spheroidals"*, arXiv:1711.03502, **Nature Astronomy 2 (2018) 907-912**, with *Hai-Bo Yu*

8) *"Impact of cosmic-ray physics on DM indirect searches"*, arXiv:1802.00636, **Adv.High Energy Phys. 2018 (2018) 3010514**, with *Daniele Gaggero*

9) *"On velocity-dependent dark matter annihilations in dwarf satellites"*, arXiv:1804.05052, **JCAP 12 (2018) 12**, with *Mihael Petac, Piero Ullio*

10) *"Model-independent Bounds on the Standard Model EFT from Flavour Physics"*, arXiv:1812.10913, **PLB 135062**, with *Luca Silvestrini*

11) *"New Physics in $b \to s\ell^+\ell^-$ confronts new data on Lepton Universality"*, arXiv:1903.09632, **EPJC 79 (2019) 8**, with *Marco Ciuchini, Antonio Coutinho, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

12) *"Too Big To Fail in Light of Gaia"*, arXiv:1904.04939, **MNRAS 490 (2019) 1**, with *Manoj Kaplinghat, Hai-Bo Yu*

13) *"HEPfit: a Code for the Combination of Indirect and Direct Constraints on High Energy Physics Models"*, arXiv:1910.14012, **EPJC 80 (2020) 5**, *HEPfit collaboration, see https://hepfit.roma1.infn.it*

14) *"Entering the Era of Dark Matter Astronomy? Near to Long-Term Forecasts in X-Ray and Gamma-Ray Bands"*, arXiv:2003.00148, **PRD 102 (2020) 8**, with *Kevork N. Abazajian, Dawei Zhong*

15) *"B anomalies under the lens of EW precision"*, arXiv:2007.04400, **JHEP 12 (2020) 016**, with *Lina Alasfar, Aleksandr Azatov, Jorge de Blas, Ayan Paul*

16) *"Minimal Froggatt-Nielsen textures"*, arXiv:2009.05587, **JHEP 03 (2021) 135**, with *Marco Fedele, Alessio Mastroddi*

17) *"Lessons from the $B^{0,+} \to K^{*0,+}\mu^+\mu^-$ angular analyses"*, arXiv:2011.01212, **PRD 103 (2021) 1**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

18) *"Simple and statistically sound strategies for analysing physical theories"*, in collaboration with several fit working groups as *HEPfit* developer, arXiv:2012.09874, **Rept.Prog.Phys. 85 (2022) 5**

19) *"Gamma Factory searches for extremely weakly-interacting particles"*, arXiv:2105.10289, **PRD 104 (2021) 5**, with *Sreemanti Chakraborti, Jonathan L. Feng, James K. Koga*

List of publications

20) *"Charming Penguins and Lepton Universality Violation in $b \to s\ell^+\ell^-$ decays"*, arXiv:2110.10126 , **EPJC 83 (2023) 1**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

21) *"Motivations for a Large Self-Interacting Dark Matter Cross Section from Milky Way Satellites"*, arXiv:2203.10104 , **MNRAS 518 (2022) 2**, with *James Bullock, Manoj Kaplinghat, Victor Robles, Maya Silverman*

22) *"Violation of custodial symmetry from W-boson mass measurements"*, arXiv:2204.05267 , **PRD 106 (2022) 1**, with *Ayan Paul*

23) *"Indications for a Nonzero Lepton Asymmetry from EMP Galaxies"*, arXiv:2206.00693 , **PRL 130 (2023) 13**, with *Anne-Katherine Burns, Tim Tait*

24) *"New UTfit Analysis of the Unitarity Triangle in the Cabibbo-Kobayashi-Maskawa scheme"*, arXiv:2212.03894 , **Rend. Lincei Sci. Fis. Nat. 34 (2023)**, with *UTfit collaboration*

25) *"Constraints on lepton universality violation from rare B decays"*, arXiv:2212.10516 , **PRD 107 (2023) 5**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

26) *"PRyMordial: the first three minutes, within and beyond the standard model"*, arXiv:2307.07061 , **EPJC 84 (2024) 1**, with *Anne-Katherine Burns, Tim Tait*

27) *"The QCD Axion: Some Like It Hot"*, arXiv:2310.08169 , **under revision for PRL**, with *Federico Bianchini, Giovanni Grilli di Cortona*

28) *"Halo Densities and Pericenter Distances of the Bright Milky Way Satellites as a Test of Dark Matter Physics"*, arXiv:2311.01528 , **under revision for MNRAS**, with *Kevin Andrade, Manoj Kaplinghat*

29) *"Feedback in the dark: a critical examination of CMB bounds on primordial black holes"*, arXiv:2403.18895 , **under revision for JCAP**, with *Dominic Agius, Rouven Essig, Daniele Gaggero, Francesca Scarcella, Gregory Suczewski*

Metrics

As of April 23$^{\rm rd}$ 2024, according to the INSPIRE-HEP database (restricting to published papers only), my **h-index** is **21**, with **26 publications** (excluding proceedings) and **2097 citations**, with averaged citations per paper of 80.7.

- inSPIRE: http://inspirehep.net/author/profile/Mauro.Valli.1
- Google Scholar: scholar.google/Mauro.Valli
- ORCID iD: https://orcid.org/0000-0002-0899-3735

Highlights on work in progress

- *"Charming Sensitivities for New Higgses at LHC"*, with *Artemis Sofia Giannakopoulou, Patrick Meade*
- *"Very strong dark matter self-interactions and the diversity of galactic rotation curves"*, with *Grant Roberts, Manoj Kaplinghat, Hai-Bo Yu*
- *"Analyticity and the Absence of Evidence Fallacy in $b \to s\,\ell^+\ell^-$"*, with *Marco Ciuchini, Marco Fedele, Ayan Paul, Luca Silvestrini*
- *"Constraining new physics effective interactions via a global fit of electroweak, Higgs, top, and flavor observables"*, with *Jorge de Blas, Angelica Goncalves Dos Santos, Victor Miralles, Laura Reina, Luca Silvestrini*

Lines of Research

- ⋆ **Dark Matter Physics** – Theory, Observations and Detection
- ⋆ **Early & Late Universe** – Cosmology of Visible and Dark Sectors
- ⋆ **Effective Field Theories** – Bottom-up Approaches to New Physics
- ⋆ **Flavour and CP Violation** – Standard Model Physics and Beyond
- ⋆ **Statistical Advanced Tools** – HEP/ASTRO/COSMO Data Analysis

Teaching & Supervision

Lecturer at Sapienza for the Ph.D. course "Effective Field Theories and Applications to Flavor Physics". Lecturer on the "The Dark Matter problem" at Petnica Summer Institute 2015, Valjevo, Serbia. I supervised work in the M.Sc. program of

Assignments

I am a member of the Steering Committee of the Pollica Physics Center. I have taken part to the organizational process of all workshops held in Pollica, Italy, over the past three years. I have been one of the main organizers of the workshop event "Dark Pollica 2022" and the Simons program "Lighting new Lampposts for Dark Matter and Beyond the Standard Model". I served as one of the conveners of the Intensity Frontier at the conference "IFAE 2024". I was invited to chair at the workshop "Dark Interactions 2022" and "Anomalies 2023" in USA. I contributed to the event for Italian high-school students "Open Day INFN 2024" and gave a public masterclass in Rome for the "International Day for Women in Science 2024" at Sapienza. I served in committees responsible for assigning postdoctoral positions. I refereed on JCAP, JHEP, MNRAS, Phys.Dark Univ.. At UCI, YITP and Sapienza I have been in charge of the organization of theory seminars, pheno journal clubs and astroparticle meetings.

Highlight on events as attendee

- Workshop "Novel Ideas for Dark Matter 2019", Princeton - USA
- Workshop "GalFRESCA 2018", Caltech - USA
- Workshop "Off-the-Beaten-Track Dark Matter and Astrophysical Probes of Fundamental Physics 2015", ICTP - Trieste
- School on Astroparticle Physics "CASPAR 2014", DESY - Hamburg
- Lectures on Fundamental Interactions at GGI 2014, Ph.D. school - Florence
- Conference "Dark Side of the Universe 2013", SISSA - Trieste
- Pre-school and Conference "SUSY 2013", ICTP - Trieste

Seminars

- University of Siegen, Germany, **"Behind the Flavour Anomalies: Where Do We Stand?"**, Apr 2024
- Sapienza, Rome, Italy, **"Flavor, EW precision & BSM"**, Mini-Workshop "ENP Meeting", Feb 2024
- GGI, Florence, Italy, **"The QCD Axion: Some Like It Hot"**, Mini-Workshop "TPPC Meeting", Feb 2024
- LNF, Frascati, Italy, **"Discussion: Hot Axions"**, Workshop "Axion Origins", Jan 2024
- IFPU, Trieste, Italy, **"The QCD Axion: Some Like It Hot"**, Workshop "7th Trilateral Meeting", Dec 2023
- Sapienza, Rome, Italy, **"On the Cosmological Bound on Primordial Black Holes"**, Workshop "Future Perspectives on PBHs", Dec 2023
- Carleton University, Ottawa, Canada, **"PRyMordial: The First 3 Minutes in A Few Seconds"**, May 2023
- UCSC, Santa Cruz, USA , **"Hints for a Nonzero Lepton Asymmetry of Primordial Origin"**, May 2023
- SITP, Stanford, USA , **"Hints for a Nonzero Lepton Asymmetry of Primordial Origin"**, May 2023
- SLAC, Stanford, USA , "B **anomalies circa '23: A Theorist's Perspective?"**, May 2023
- SCGP, Stony Brook, USA, "B **anomalies circa '23: A Theorist's Perspective?"**, Mar 2023
- BaBar meetings, online, "B **anomalies circa '22: A Theorist's Perspective?"**, Dec 2022
- KIT, Karlsruhe, Germany, **"BBN circa '22: New Physics from the Early Universe?"**, Dec 2022
- Perimeter, Waterloo, Canada, **"BBN circa '22: New Physics from the Early Universe?"**, Oct 2022
- PPC, Pollica, Italy **"Dark Matter Discussion: Astro"**, June 2022
- IFIC, Valencia, Spain, **"Hints from Flavor: Where Are We Going?"**, May 2022
- CNT, Stony Brook, USA, **"New Physics Hints from present Flavor data"**, May 2022
- CERN, online, **"Flavour assumptions in the SMEFT"**, Workshop "LHC EFT Working Group", Feb 2022
- CCA, New York, USA, **"PRyMordial: The first 3 min in $\mathcal{O}(10)$ sec"**, Oct 2021
- YITP, Stony Brook, USA, **"Looking for NP in the Lab and in the Sky"**, Sept 2021
- MIPT, Moscow, online, **"Astrophysical Signatures of SIDM"**, Workshop "Quarks 2020 – Dark Matter", June 2021
- Sapienza, Rome, online, **"Low energy and flavour EFT probes "**, Workshop "SM@LHC 2021", Apr 2021
- CERN, online, **"Model-independent Bounds on the Standard Model EFT from Flavour Physics"**, Workshop "Heavy Flavour Aspects in EFTs", Apr 2021
- UF, Gainesville, online, **"Dark Matter, Self-interactions & Dwarfs"**, Mar 2021
- FSU, Tallahassee, online, **"Probing the Standard Model EFT with Flavor"**, Feb 2021

Seminars

- Cornell, online, **"B anomalies under the lens of EW precision"**, Oct 2020
- UCI+UCSC, online, **"B anomalies under the lens of EW precision"**, Aug 2020
- UCI, Irvine, USA, **"BSM hints from B physics"**, Workshop "SoCalBSM 2019", Sept 2019
- UCI, Irvine, USA, **"Dark Matter self-interactions in Milky Way dSphs"**, Workshop "GalFRESCA 2019", Aug 2019
- MITP, Mainz, Germany, **"Model-independent bounds on the SMEFT from Flavour Physics"**, Workshop "LHCb and Belle II Opportunities for Model Builders 2019", Jan 2019
- UCI, Irvine, USA, **"Dwarf spheroidal galaxies as a tool for New Physics"**, Nov 2018
- RWTH, Aachen, Germany, **"Hints for New Physics from $b \to s$ transitions"**, Jun 2018
- GRAPPA, Amsterdam, Netherlands, **"Hints for New Physics from $b \to s$ transitions"**, May 2018
- Latin America Webinar, lawphysics, **"The Self-Interacting Dark Matter paradigm and the Satellites of the Milky Way'**, Jan 2018
- University of Oslo, Norway, **"Bayesian inference of Self-Interactions in the Dark Matter Halo of Milky Way Dwarfs"**, Nov 2017
- Barolo (University of Turin), Italia, **"J- and D-factors determination"**, Workshop "Barolo Astroparticle Meeting", Sept 2017
- NBIA, Copenaghen, Denmark, **"Opportunities for a new Dark Matter paradigm with the internal dynamics of Milky Way dwarfs"**, Workshop "Self-Interacting Dark Matter", Aug 2017
- CERN, Geneve, Switzerland, **"Knowns and Unknowns in Lepton Flavour Universality Violation fits"**, "Instant workshop on B anomalies", May 2017
- GRAPPA, Amsterdam, Netherlands, **"Searching for New Physics through Dwarf Spheroidal Galaxies"**, Mar 2017
- UCR, Riverside, USA, **"Hints for NP from $b \to s$ transitions"**, Jan 2017
- SISSA, Trieste, Italy, **"A glimpse on Dark Matter particles shining through the gamma-ray sky"**, Ph.D. defense, Sept 2016
- International Center for Theoretical Physics, Trieste, Italy, **"B to $\mathbf{K^*}$ll at larger recoil: a theoretical reappraisal"**, Feb 2016
- CERN, Geneve, Switzerland, **"Extracting QCD corrections from data"**, Workshop "LHCb implications and future prospects 2015", Nov 2015
- California Tour: UCSC, Santa Cruz + BCTP, Berkeley + SLAC, Stanford, + UCI, Irvine, **"Back to the Standard lore: About the LHCb anomaly and the Galactic Center excess"**, Aug – Sept 2015
- University of Turin, Italy, **"Looking for Dark Matter in Dwarf Spheroidal Galaxies"**, Workshop "Theoretical Astroparticle Physics", Jul 2015
- HCTP, Edinburgh, Scotland, **"$B \to K^* \mu\,\mu$: Charming Penguins strike back again?"**, Workshop "Rare B decays in 2015", May 2015

Talks at international conferences

- RomaTre, Rome, Italy, **"Overview and Theorerical Prospects for CKM matrix and CP violation"**, Conference "WIFAI 2023", Nov 2023
- University of Mississippi, online, USA, **"Update on the Unitarity Triangle global fits by the UTfit Collaboration"**, Conference "FPCP 2022", May 2022
- LIP, Portugal, online, **"Anomalies and Opportunities in Indirect Searches for Dark Matter"**, Conference "PANIC 2021", Sept 2021
- IBS, Korea, online, **"Gamma Factory searches for extremely weakly-interacting particles"**, Conference "PASCOS 2021", June 2021
- Northeastern University, Boston, USA, **"An EFT look at LFUV in $b \to s\ell^+\ell^-$"**, Conference "APS-DPF 2019", Jul 2019
- Northeastern University, Boston, USA, **"Dark Matter self-interactions in Milky Way dSphs"**, Conference "APS-DPF 2019", Jul 2019
- IPNL, Lyon, France, **"On B anomalies: Fitting outside the box"**, Conference "LIO International Conference on Flavour Physics", Apr 2018
- Venice (University of Padova), Italy, **"A systematic study of discriminators between New Physics & Standard Model in b $\to$ s transitions"**, Conference "EPS-HEP 2017", Jul 2017
- Venice (University of Padova), Italy, **"Looking for New Physics in the Satellites of the Milky Way"**, Conference "EPS-HEP 2017", Jul 2017
- Kavli IPMU, Kashiwa, Japan, **"Towards a refined understanding of the GC excess"**, Conference "TeVPa 2015", Oct 2015
- Tahoe Lake (UC Davis), California, **"$B \to K^* \mu\,\mu$: Charming Penguins strike back again?"**, Conference "SUSY 2015", Aug 2015
- Tahoe Lake (UC Davis), California, **"On the robustness of DM limits from dSph galaxies"**, Conference "SUSY 2015", Aug 2015
- SISSA, Trieste, Italy, **"On the robustness of DM limits from dSph galaxies"**, Workshop "Astro@TS 2015", Jun 2015