

Fabrizio Nesti - Curriculum Vitae

PERSONAL INFORMATION

Name and surname **Fabrizio Nesti**
 Academic position Associate Professor, Università degli Studi dell'Aquila, Italia
 Citizenship Italian
 Date and place of birth 21/02/1967, Pontedera, Italy

WORK EXPERIENCE

Date (from – until) **2017/11-present**
 Institution Università degli Studi dell'Aquila, L'Aquila, Italia
 Position Associate Professor

Date (from – until) **2013/09-2017/12**
 Institution Ruđer Bošković Institute, Zagreb, Croatia
 Position Senior Research Associate (equivalent to First Researcher)

Date (from – until) **2016-2017**
 Institution Università degli Studi di Trieste, Trieste, Italia
 Position Ricercatore a Tempo Determinato (B)

Date (from – until) **2013-2014**
 Institution Gran Sasso Science Institute, L'Aquila, Italy
 Position Researcher, External Collaborator

Date (from – until) **2010-2011**
 Institution Ferrara University, Italy
 Position Postdoc (Assegno di Ricerca)

Date (from – until) **2004-2009 and 2011-2012**
 Institution L'Aquila University & INFN-LNGS, Italy
 Position Postdoc (Assegno di Ricerca)

Date (from – until) **2000-2003**
 Institution SISSA's MediaLab, SISSA, Italy
 Position Coordinator position (EP4)
 Work field *Scientific Publishing (INDICO, JHEP)*

Date (from – until) **1998-1999**
 Institution SISSA, Italy
 Position Postdoc (Assegno di Ricerca)

EDUCATION

Degree in Physics 01/07/92, *University of Pisa*, Italy
 Ph.D in Physics 01/10/96, *SISSA*, Trieste, Italy

SCIENTIFIC TITLES

2014 **Scientific habilitation to italian professorship, Prima Fascia**
 2014 **Scientific habilitation to italian professorship, Seconda Fascia**
 2013 **French qualification for Maitre de Conférences**
 2012 **Croatian habilitation to "senior research associate"**

LANGUAGES**ITALIAN :** MOTHER TONGUE**ENGLISH :**

Speaking/Writing/Reading Fluent/Excellent/Excellent

FRENCH :

Speaking/Writing/Reading Good/Good/Good

CROATIAN :

Speaking/Writing/Reading Good/Basic/Good

RESEARCH AND OTHER PROJECTS

(REVERSE CHRONOLOGICALLY; LEADER AND ASSOCIATES; FUNDING SOURCE)

- 2023: UNIVAQ project FINE-QM: Principal investigator
- ITALIAN-PRIN - 2020 - Fisica Astroparticellare: (coordinator N. Fornengo) associate member
- 2016-2019: coordinator of H2020 CSA Twinning project - RBI-T-WINNING Theoretical physics (RBI as main node, with SISSA (Trieste), LMU (Munich), LPT (Orsay) and NBI (Copenhagen))
- 2016-2019: External Association to ATLAS experiment, on Lepton number violating Higgs decays.
- 2016-2018: External Association to Fermi experiment, on DM limits from galactic gamma rays.
- 2014-2019: Associate to Croatian Science Foundation project: Physics of the Standard Model and Beyond
- ITALIAN-PRIN - 2008 - Fisica Astroparticellare: Neutrini e Cosmologia (coordinator G. Fogli) associate
- ITALIAN-PRIN - 2006 - Fisica Astroparticellare: Neutrini ed Universo Primordiale (coordinator G. Fogli) associate
- ITALIAN-PRIN - 2004 - Fisica Astroparticellare (coordinator G. Fogli) associate
- ITALIAN-PRIN - 2002 - Fisica Astroparticellare (coordinator G. Fogli) associate
- EU 5th FP: 1999-2002 TIPS (Tools for Innovative Publishing in Science) associate
- EU 5th FP: 2001-2003 InDiCo (Integrated Digital Conferences) manager

TEACHING

(CHRONOLOGICALLY; UNDERGRADUATE, GRADUATE , POSTGRADUATE STUDY PROGRAMMES)

- 1997/98: "Institutions of Mathematical Analysis", Univ. of Milano Bicocca (Environmental Sciences) including examination and grading.
- 2004/06: lectures for the course "Theoretical Physics", at University of L'Aquila.
- 2011: Lecturer on "Neutrino at Colliders", at the international Summer School on Particle Physics, ICTP.
- 2016: PhD course of Cosmology at University of Zagreb.
- 2017: PhD course of Cosmology at University of Zagreb.
- 2018, 21, 22: Particle Physics at Laurea Magistrale University of L'Aquila. (part of the course)
- 2018: Astrophysics at Laurea Magistrale e Triennale, University of L'Aquila. (part of the course)
- 2018/19, 19/20 Fisica I, Ingegneria Informatica @ University of L'Aquila.
- 2018/19, 19/20 20/21/21/22: General Relativity and Cosmology, Laurea Magistrale in Fisica@ L'Aquila.
- 2020/21/21/22: Advanced Cosmology, Laurea Magistrale in Fisica@ L'Aquila.

MENTORSHIP OF DEFENDED DOCTORAL AND MASTER DISSERTATIONS AND TRAINING OF YOUNG RESEARCHERS AND SCIENTISTS

- 2008: tutor on "Experimental tests of Gravity and the PPN formalism" (M. Crisostomi).
- 2008: tutor of MS degree on "CP violation and new contributions in Left-Right symmetric models" (A. Maiezza).

Master Theses at University of L'Aquila

- 2015: **Advisor** on “Fermionic Dark Matter” (Chiara Di Paolo, now at SISSA)
- 2019: **Advisor** on “Superfluidity in fermionic Dark Matter Halos” (Simone Masci)
- 2020: **Advisor** on “The Galactic Dark Matter distribution” (Claudia Di Cesare, now at UniRoma1)
- 2021-22: **Advisor** on “Dark matter in LSB galaxies” (Jessica Ferrara)
- 2021-22: **Advisor** on “Numerical Gravitational Waves from Neutron Star merging” (Lorenzo Cipriani)
- 2007-21: Evaluator for a number of **Master Theses**

– PhD theses:

- 2009-2012 **Advisor** of Alessio Maiezza, on “Left-Right symmetric models and LHC” at University of L'Aquila.
- 2015-2020: **Advisor on Collider Particle Phenomenology at IRB and University of Zagreb** (G. Popara)
- 2007-2020: Evaluator for a number of PhD theses at SISSA, UnivAQ, and worldwide.

VISITS TO FOREIGN RESEARCH AND EDUCATION INSTITUTIONS

(CHRONOLOGICALLY)

ICTP, Trieste - a number of invited sojourns (from 04/2004 to 10/2011, longest six months)

Ludwig Maximilian University, Munich - G. Dvali Chair - invited sojourn (from 10/2011)

CERN, Geneva - a number of sojourns for collaboration and invited seminars (from 05/2004 to 08/2012, longest 4 months)

ORGANIZATION

(CHRONOLOGICALLY; ORGANIZATION OF HOME AND INTERNATIONAL SCIENCE EVENTS)

Organizer of a number of editions of the *Gran Sasso Summer Institute* - LNGS (2004-2008).

Organizer of ICTP Workshop "Neutrino at LHC" (2013)

Organizer of workshop “Flavour and new physics” Frejus, 2016.

Organizer of workshop “LHC days in Split” Split, 2016.

Organizer of school “First Zagreb school on Theoretical physics” Zagreb, 2017

Organizer of international conference “Cosmology2018” Dubrovnik, 2017

Organizer of international conference “Cosmology2022” Duino, 2022

Organizer of L'Aquila Astroparticle Colloquia 2021-22 (with LNGS and GSSI)

PRIZES

Prize for two best *Rudjer Boskovic Institute* publications in 2015

Present and Future K and B Meson Mixing Constraints on TeV Scale Left-Right Symmetry

Stefano Bertolini, Alessio Maiezza, Fabrizio Nesti, Phys. Rev. D89 (2014) 9, 095028 [1403.7112 [hep-ph]]

Nonderivative Modified Gravity: a Classification

Denis Comelli, Fabrizio Nesti, Luigi Pilo, JCAP 1411 (2014) 11, 018 [arXiv:1407.4991 [hep-th]]

Prize for best *Rudjer Boskovic Institute* publication in 2016

Lepton Number Violation in Higgs Decay

Alessio Maiezza, Miha Nemevsek, Fabrizio Nesti

Phys. Rev. Lett. 115 (2015) 081802 [arXiv:1503.06834 [hep-ph]]

PUBLICATIONS

(CHRONOLOGICALLY; INTERNATIONAL RESEARCH JOURNALS, INTERNATIONAL CONFERENCE PROCEEDINGS)

1. Neural Networks for Triggering
F. Bedeschi, C. Bowers, M. Campbell, N. Chriss, B. Denby, F. Nesti,
IEEE Trans. Nucl. Sci. 37 (1990) No. 2, 248
2. Multimatrix Models: Integrability Properties and Topological Content
L. Bonora, F. Nesti, E. Vinteler,
Int. J. Mod. Phys. A11 (1996) 1797 [hep-th/9506124]
3. The Drinfeld Twist for $sl_q(2)$
L. Dabrowski, F. Nesti, P. Siniscalco,
Proceedings of the "12th Italian Conference on General Relativity and Gravitational Physics",
Roma 1996; World Sci. 1997 [q-alg/9610012]
4. A Finite Quantum Symmetry for $M(3,C)$
L. Dabrowski, F. Nesti, P. Siniscalco,
Int. J. Mod. Phys. A13 (1998) 4147-4162 [hep-th/9705204]
5. Three Dimensional Large N Monopole Gas
F. Nesti,
hep-th/9610127, SISSA-143-96-EP, Oct 1996
6. Aspects of Large N Analysis for Yang-Mills-Higgs and Matrix Models
F. Nesti,
SISSA, Ph.D. thesis, Trieste, 1996
7. Matrix String Theory, 2D SYM Instantons and Affine Toda Systems
G. Bonelli, L. Bonora, F. Nesti,
Phys. Lett. B435 303-311 (1998) [hep-th/9805071]
8. String Interactions from Matrix String Theory
G. Bonelli, L. Bonora, F. Nesti,
Nucl. Phys. B538 100-116 (1999) [hep-th/9807232]
9. Matrix String Theory and its Moduli Space
G. Bonelli, L. Bonora, F. Nesti, A. Tomasiello,
Nucl. Phys. B554 103-135 (1999) [hep-th/9901093]
10. Heterotic Matrix String Theory and Riemann Surfaces
G. Bonelli, L. Bonora, F. Nesti, A. Tomasiello,
Nucl. Phys. B564 86-102 (2000) [hep-th/9905092]
11. The Journal of High Energy Physics: Scientific Publishing On The Web
F. Asnicar, P. Dall'Aglio, S. Cerrato, A. de Felice, M. Di Fant, M. Mizzaro, F. Nesti, M. Candusso, M. Miculan,
WebNet (2) 1999: 1482
12. Perspectives in Neutrino Physics
B. Bajc, F. Nesti, G. Senjanović, F. Vissani
In Proceedings of the "17th Rencontres de Physique de la Valle d'Aoste: Results and Perspectives in Particle Physics", La Thuile,
Mar 2003
13. $SO(10)$ Fermion Masses from Rank-1 Structures of Flavour
F. Nesti
Bari, Ottobre 2004, Nucl. Phys. (Proc Suppl), 145 (2005) 258–262
14. Mirror World, Supersymmetric Axion and Gamma Ray Bursts
L. Gianfagna, M. Giannotti, F. Nesti
JHEP 0410:044 (2004) [hep-ph/0409185]
15. Nucleon-Nucleon Bremsstrahlung Emission of Massive Axions
M. Giannotti, F. Nesti
Phys. Rev. D 72, (2005) 069801 [hep-ph/0505090] 5
16. Supersymmetric $SO(10)$ for Fermion Masses and Mixings: Rank-1 Structures of Flavour
Z. Berezhiani, F. Nesti
JHEP 0603:041 (2006) [hep-ph/0510011]
17. Soft SUSY breaking contributions to Proton Decay
Z. Berezhiani, F. Nesti, L. Pilo
JHEP 0610:030 (2006) [hep-ph/0607303]
18. Fermion Masses at intermediate $\tan\beta$: Unification of Yukawa Determinants
F. Nesti
Proceedings of QUARKS'06 [hep-ph/0610307]
19. Spontaneous Lorentz breaking and massive gravity
Z. Berezhiani, D. Comelli, F. Nesti, L. Pilo
Phys. Rev. Lett. 99 (2007) 131101 [hep-th/0703264]
20. Standard Model and Gravity from Spinors,
F. Nesti,
Eur. Phys. J C59 (2009) 723–729 [hep-th/0706.3304]
21. Graviweak Unification,
F. Nesti, R. Percacci,
J. Phys. A, Math. Theor. 41 (2008) 075405 [hep-th/0706.3307]
22. Flavour physics of leptons and dipole moments
M. Raidal et al.,
Eur. Phys. J. C57 (2008) 13–182, (CERN WG on Flavour Symmetries) [hep-ph/0801.1826]
23. Exact spherically symmetric solutions in massive gravity
Z. Berezhiani, D. Comelli, F. Nesti, L. Pilo,

- JHEP 0807:130 (2008), [hep-ph/0803.1687]
24. Gravity Modification with Yukawa-type Potential: Dark Matter and Mirror Gravity
Z. Berezhiani, F. Nesti, L. Pilo and N. Rossi,
JHEP 0907:083 (2009), [hep-ph/0902.0144]
 25. Lorentz Breaking Massive Gravity in Curved Space
D. Blas, D. Comelli, F. Nesti and L. Pilo,
Phys. Rev. D 80 (2009) 044025 [hep-th/0905.1699]
 26. Chirality in unified theories of gravity
F. Nesti, R. Percacci,
Phys. Rev. D 81 (2010) 025010, [hep-th/0909.4537]
 27. The dark matter density at the Sun's location
P. Salucci, F. Nesti, G. Gentile, C.F. Martins,
Astronomy & Astrophysics 523 (2010) A83, [astro-ph/1003.3103]
 28. Left-Right symmetry at LHC
A. Maiezza, M. Nemevšek, F. Nesti, G. Senjanović
Phys. Rev. D 82 (2010) 055022, [hep-ph/1005.5160]
 29. Stars and (furry) Black Holes in Lorentz Breaking Massive Gravity
D. Comelli, F. Nesti, L. Pilo
Phys. Rev. D 83 (2011) 084042, [hep-th/1010.4773]
 30. Left-Right Symmetry: from LHC to Neutrinoless Double Beta Decay
V. Tello, M. Nemevšek, F. Nesti, G. Senjanović, F. Vissani
Phys. Rev. Lett. 106 (2011) 151801, [hep-ph/1011.3522]
 31. Three Extra Mirror or Sequential Families: A Case for Heavy Higgs and Inert Doublet
H. Martinez, A. Melfo, F. Nesti, G. Senjanović
Phys. Rev. Lett. 106 (2011) 191802, [hep-ph/1101.3796]
 32. First Limits on Left-Right Symmetry Scale from LHC Data
M. Nemevšek, F. Nesti, G. Senjanović, Y. Zhang
Phys. Rev. D (2011) 83 115014, [hep-ph/1103.1627]
 33. Pearson's random walk in the space of the CMB phases. Evidence for parity asymmetry
M. Hansen, A.M. Frejsel, J. Kim, P. Naselsky, F. Nesti
Phys. Rev. D 83 (2011) 103508, [astro-ph/1103.6135]
 34. Finite energy for a gravitational potential falling slower than $1/r$
D. Comelli, M. Crisostomi, F. Nesti, L. Pilo
Phys. Rev. D 84 (2011) 104026, [hep-th/1105.3010]
 35. Inert Higgs Dark Matter and Extra/Mirror Families, after Xenon100
A. Melfo, M. Nemevšek, F. Nesti, G. Senjanović, Y. Zhang
Phys. Rev. D 84 (2011) 034009 [hep-ph/1105.4611]
 36. Type II Seesaw at LHC: The Roadmap
A. Melfo, M. Nemevšek, F. Nesti, G. Senjanovic, Y. Zhang,
Phys. Rev. D 85 (2012) 055018 [1108.4416 [hep-ph]]
 37. Spherically Symmetric Solutions in Ghost-Free Massive Gravity
D. Comelli, M. Crisostomi, F. Nesti, L. Pilo
Phys. Rev. D 85 (2012) 024044 [1110.4967 [hep-th]]
 38. FRW Cosmology in Ghost Free Massive Gravity
D. Comelli, M. Crisostomi, F. Nesti, L. Pilo
JHEP 1203 (2012) 067 [1110.4967 [hep-th]]
 39. Neutrinoless Double Beta Decay: Low Left-Right Symmetry Scale?
M. Nemevšek, F. Nesti, G. Senjanović, V. Tello
arXiv.org:1112.3061 [hep-ph]
 40. Magnetic anomaly in UCN losses: a signal for neutron oscillations to parallel world?
Z. Berezhiani, F. Nesti
Eur. Phys. J. C 72, 4 (2012) 1974 (Letter) [1203.1035 [hep-ph]]
 41. Degrees of freedom in Massive Gravity
D. Comelli, M. Crisostomi, F. Nesti, L. Pilo
Phys. Rev. D 86 (2012) 101502, [1204.1027 [hep-th]]
 42. New physics in ε' from gluomagnetic contributions and limits on Left-Right symmetry
S. Bertolini, J.O. Eeg, A. Maiezza, F. Nesti
Phys. Rev. D 86 (2012) 095013, [1206.0668 [hep-ph]]
 43. The Local Dark Matter Density
F. Nesti, P. Salucci
Proceedings of Conference: Dark Side of the Universe, 2012 arXiv:1212.3670 [astro-ph.CO]
 44. Weak Massive Gravity
D. Comelli, F. Nesti, L. Pilo
Phys. Rev. D 87 (2013) 124021, [1302.4447 [hep-th]]
 45. The Dark Matter Halo of the Milky Way, AD 2013
F. Nesti, P. Salucci
JCAP,07:016 (2013) [1304.5127 [astro-ph.GA]]
 46. Massive gravity: a General Analysis
D. Comelli, F. Nesti, L. Pilo
JHEP07:161 (2013), [1305.0236 [hep-th]]

47. K to $\pi\pi$ hadronic matrix elements of left-right current-current operators
S. Bertolini, A. Maiezza, F. Nesti
Phys. Rev. D 88, 034014 (2013) [1305.5739 [hep-ph]]
48. Cosmology in General Massive Gravity Theories
Denis Comelli, Fabrizio Nesti, Luigi Pilo
JCAP 1405 (2014) 036, [1307.8329 [hep-th]]
49. Present and Future K and B Meson Mixing Constraints on TeV Scale Left-Right Symmetry
Stefano Bertolini, Alessio Maiezza, Fabrizio Nesti
Phys. Rev. D89 (2014) 9, 095028 [1403.7112 [hep-ph]]
50. Nonderivative Modified Gravity: a Classification
Denis Comelli, Fabrizio Nesti, Luigi Pilo
JCAP 1411 (2014) 11, 018 [arXiv:1407.4991 [hep-th]]
51. Lepton Number Violation in Higgs Decay
Alessio Maiezza, Miha Nemevsek, Fabrizio Nesti
Phys. Rev. Lett. 115 (2015) 081802 [arXiv:1503.06834 [hep-ph]]
52. Perturbativity and mass scales of Left-Right Higgs bosons
Alessio Maiezza, Miha Nemevšek, Fabrizio Nesti. Mar 1, 2016.
Phys. Rev. D94 (2016) 3, 035008 [arXiv:1603.00360 [hep-ph]]
53. LNV Higgses at LHC
Alessio Maiezza, Miha Nemevšek, Fabrizio Nesti.
AIP Conf.Proc. 1743 (2016) 030008.
54. Majorana Higgses at colliders
Miha Nemevšek, Fabrizio Nesti, Juan Carlos Vasquez
JHEP 1704 (2017) 114 [arXiv:1612.06840 [hep-ph]]
55. On the possible enhancement of the dark matter density distribution at the galactic center
V. Gammaldi, V. Avila-Reese, O. Valenzuela, A.X. Gonzalez-Morales, P. Salucci, Fabrizio Nesti
proceedings of LARIM 2016 "XV Latin American Regional IAU Meeting"
[arXiv:1701.07661 [astro-ph.GA]]
56. Phase space mass bound for fermionic dark matter from dwarf spheroidal galaxies
Chiara Di Paolo, Fabrizio Nesti, Francesco L. Villante
Mon.Not.Roy.Astron.Soc. 475 (2018) no.4, 5385 [arXiv:1704.06644 [astro-ph.GA]]
57. Keung-Senjanović process at LHC: from LNV to displaced vertices to invisible decays
Miha Nemevšek, Fabrizio Nesti, Goran Popara
Phys Rev. D. in press [arXiv:1801.05813 [hep-ph]]
58. Searching for Long-Lived Particles beyond the Standard Model at the Large Hadron Collider
J. Alimena et al..
Journal of Physics G 47 (2020) 9, 090501 [arXiv:1903.04497]
59. Kaon CP violation and neutron EDM in the minimal left-right symmetric model
Stefano Bertolini, Alessio Maiezza, Fabrizio Nesti
Phys.Rev.D 101 (2020) 3, 035036 • [arXiv:1911.09472]
60. New high-sensitivity searches for neutrons converting into antineutrons and/or sterile neutrons at the HIBEAM/NNBAR experiment at the European Spallation Source
A. Addazi et al
J.Phys.G 48 (2021) 7, 070501 • [arxiv:2006.04907 [physics.ins-det]]
61. Axion-mediated forces, CP violation and left-right interactions
Stefano Bertolini, Luca Di Luzio, Fabrizio Nesti
Phys.Rev.Lett. 126 (2021) 8, 081801 • [arxiv:2006.12508 [hep-ph]]
62. Parity from a gauge symmetry
Alessio Maiezza, Fabrizio Nesti
Eur.Phys.J.C 82 (2022) 5, 491, [arxiv:2111.11076 [hep-th]]
63. Parity from SO(7, 1) and SO(7, 7) gauge symmetries
Fabrizio Nesti, Alessio Maiezza
PoS DISCRETE2020-2021 (2022) 041
64. The Quest for the Nature of the Dark Matter: The Need of a New Paradigm
Fabrizio Nesti, Paolo Salucci, Nicola Turini
Astronomy 2 (2023) 2, 90-104
65. Left-Right Symmetry at FCC-hh
Miha Nemevšek, Fabrizio Nesti
arxiv: 2306.12104 [hep-ph]

Summary: (SLAC INSPIRE March 2022 / ISI WOS, March 2022)

Published only papers: 50 / 55

Total citations: 3899 / 2849

Average citation per paper: 78 / 52

Hirsch index: 32 / 26

Some published papers per journal with Impact Factors

(ISI WOS 2022)

# publications	Journal	Imp.Fact.	Quartile
5	PRL	7.93	Q1
3	JCAP	5.88	Q1
9	JHEP	5.62	Q1
4	EPJC	5.25	Q1
20	PRD	4.69	Q2
1	PLB	4.57	Q1
3	Nucl.Phys. B	4.32	Q2

10 SELECTED WORKS

Area 'BEYOND THE STANDARD MODEL'

- *Grand Unification and Supersymmetry* Models of SU(3) flavour. the main work is

[A1] Z. Berezhiani, F.N., Supersymmetric SO(10) for fermion masses and mixings: Rank-1 structures of flavor, JHEP 0603, 041 (2006).

which has received attention from a number of experts, invitations to conferences, and invitations to participate in the CERN Working Group for the future of flavour symmetries (resulted in the publication [15] M. Raidal et al., Flavour physics of leptons and dipole moments Eur. Phys. J. C57 (2008) 13-182).

- *Low scale Parity Restoration* (with G. Senjanović, F. Vissani, et al.)

[A2] A. Maiezza, M. Nemevšek, F.N., G. Senjanović, Left-Right Symmetry at LHC, PRD 82 (2010) 055022

This is a complete study of the limits on the possibility of low scale restoration of parity. (with A. Maiezza, my student). This work has become the reference work on this topic. Citations from the leaders in the field and from experimental groups of LHC.

[A3] V. Tello, M. Nemevšek, F.N., G. Senjanović, F. Vissani, Left-Right Symmetry: from LHC to Neutrinoless Double Beta Decay, PRL 106 (2011) 151801

Observation that the current experimental evidences in favour of the Majorana nature of neutrinos allow exactly for parity to be restored at the LHC energy scale. (Citations from Petcov, Faessler e Šimković, leaders in the study of Majorana neutrinos and $0\nu\beta\beta$ decay).

[A4] Alessio Maiezza, Miha Nemevsek, F.N., Lepton Number Violation in Higgs Decay Phys.Rev.Lett. 115 (2015) 081802 [arXiv:1503.06834]

Observation that LHC can probe LNV signals in the decay of Higgs boson, with direct link to the origin of neutrino masses. This paper has led to the interest of the ATLAS collaboration and to a joint project.

Area 'GRAVITY and ASTROPARTICLE PHYSICS'

- *Large distance modifications of Gravity* (with D. Comelli, Z. Berezhiani, L. Pilo)

[B1] Z. Berezhiani, D. Comelli, FN, L. Pilo, Spontaneous Lorentz Breaking and Massive Gravity, PRL 99 (2007) 131101.

Here we studied the spontaneous breaking of the Lorentz symmetry in the gravitational sector. as a unique mean to modify gravity at large distances, avoiding the known obstructions.

[B2] D. Comelli, M. Crisostomi, FN, L. Pilo, FRW Cosmology in Ghost Free Massive Gravity, JHEP 1203 (2012) 067, [1110.4967 [hep-th]]

In this work we found the conditions on the modified massive gravity theory to have a well behaved cosmology. This opened the way to a general classification of admissible theories of gravity modified at large distances.

- *Models of unified gravity* (alone and with R. Percacci)

[B3] F.N., Standard Model and Gravity from Spinors EPJ C 59 (2009) 723

[B4] F.N., R. Percacci, Chirality in unified theories of gravity, PRD 81 (2010) 025010

Study of gravity as a gauge theory starting from 'algebraic' spinors, with extended gauge group to include also ordinary interactions (preliminary for a generalization of Grande Unificazione, at the Planck scale).

In addition to the success in the field, with citations from L. Smolin (among the founders of Loop Quantum Gravity) and from V. Rubakov, it is to be noted that these works have also the subject of articles on Scientific American.

- *Assessment of the Dark Matter in our Galaxy* (with P. Salucci)

[B5] P. Salucci, F.N., et al. The dark matter density at the Sun's location A&A 523 (2010) A83

[B6] F.N, P. Salucci, The Dark Matter Halo of the Milky Way, AD 2013, JCAP,07:016 (2013)

The first is a phenomenological estimate of the local Dark Matter density, in terms of the present uncertainties in our knowledge of the Galaxy, which has become a reference work in the field of Dark Matter direct detection, with citations both from experimental groups and theoretical ones.

The second is an updated study of the present constraints on the Dark Matter density distribution in our Galaxy. With the Fermi collaboration I am applying the results to the analysis of real data.

TALKS AND SEMINARS

Recent invited talks at conferences

- Topic '*Left-Right symmetry @ LHC*':

'Quarks 2016', S. Petersburg, 2016 (plenary invited talk)

'Particle Phenomenology From the Early Universe to High Energy Colliders', Portoroz, 2015

'LHC days in SPLIT', Split, 2010, 2014 (plenary review talk), 2016

'The role of heavy fermions in fundamental physics', Portoroz, 2011

'A Look from the past into the future of High Energy Physics', Split, 2010

'Convegno Nazionale di Fisica Teorica', Cortona, 2010 (plenary talk)

'Interplay of Collider and Flavour Physics', CERN, 2009 (plenary review talk)

- Topic: '*Galactic Dark Matter density*'

'Workshop on Self Interacting Dark Matter' Niels Bohr Institute, 2017

'Workshop on the Future of Dark Matter Astro-Particle Physics: Insights and Perspectives', ICTP 2013

'Dark Side of the universe', SISSA, 2013 (plenary invited talk)

- Topic '*Exact solutions in massive gravity*':

'Gravity and other fields under the volcano', Catania, 2019

'Contemporary problems in theoretical physics', Vietri, 2011
 'Workshop on consistent infrared modifications of Gravity', Paris, 2008
 'Hot topics in Modern Cosmology', SW2, Cargese, 2008

- Topic '*Graviweak/GraviGUT unifications*':

'Hot topics in Modern Cosmology', SW3, Cargese, 2009 'Workshop on the origin of C, P, T violations', CPT@ICTP, 2008

- Topic '*Soft SUSY-breaking and proton decay*':

'Grand Unification', GUT'07, Trieste, 2007

- Topic '*SO(10) and fermion masses*':

'Workshop on Neutrino Oscillations' NOW-2003, Otranto, 2003
 '14th International Seminar on HEP' QUARKS-2006, S. Petersburg, 2006

Recent invited seminars

Topic '*Dark Matter densities*' -- FERRARA 2018, TRIESTE 2015, CERN 2012, LNGS 2012, CEA-Saclay 2012.

Topic: '*Massive gravity*' -- Ljubljana 2011, Munich 2011, Lausanne 2008, SISSA 2007.

Topic: '*Low scale Left-Right symmetry*' --SISSA 2020, TRIESTE 2015, ICTP 2011, Munich 2011, Oslo 2009. Topic: '*Unified models of Gravity*' -- Marseille, 2009.

REFEREEING

Referee for international scientific journals: NPB, JHEP, PLB, PRL.

DISSEMINATION AND OUTREACH

- 08/2014: Presentation for the cycle "Skepticals at Zagreb" "**The last mystery: Dark Matter**"
- 12/2015: Presentation for the cycle: Nobel at IRB: "Nobel 2015: **Neutrino oscillations and their masses...**"
- 09/2015: For national TV network HRT3, "Third Element": "**Experiences of foreign scientists**"
- 2015: In studio for national TV network HRT3, "Third Element": "**Discovery of gravitational waves**"
- 12/2015: Interview in national newspaper "**Brain drain and scientific mobility**"
- 12/2018,19: Presentation at Open Days of University of L'Aquila - "**The last mystery: Dark Matter**"

OTHER IMPORTANT ACTIVITIES AND SKILLS

- 1986-1990: Admitted as student to **Scuola Normale Superiore**, with fellowship for three years.
- 1997–1999: I participated in starting the **JHEP scientific journal** (<http://jhep.sissa.it>).
- 1999–2001: Administrator of the JHEP system.
- 2000–2003: Senior system manager at the SISSA's MediaLab, the SISSA laboratory for initiatives on electronic scientific publishing.
- 2000–2002, worked for the European Project TIPS (Tools for Innovative Publishing in Science) in the design, coordination and installation of a new system as evolution of the preprint archives, aiming to the integration with journals.
- 2001–2003: participated in writing and applying for the EU grant InDiCo (Integrated Digital Conferences) from SISSA as main node, with M. Fabbrichesi as general coordinator. I coordinated its development, which involved University of Udine, Amsterdam, Netherland's TNO and CERN. The main result now is the worldwide-adopted system of conferences <http://indico.cern.ch>.

- **2015 – 2019 : Wrote a proposal and coordinator for a H2020 Twinning (CSA) Grant for theoretical physics (3 years, 1 Million Eur), which includes Rudjer Boskovic Institute as main node, together with SISSA (Trieste) LMU (Munich), LPT (Orsay) and NBI (Copenhagen).**

COMPUTER SKILLS

- Yearly experience in operating system administration.
- Good knowledge of network protocols and administration. Database storage and web management. Yearly experience of users management.
- Software development: from software modeling to programming and modularization.
- Programming: Fortran, C, Perl, Java. Long practice with symbolic computer calculus, e.g. Mathematica.