

PERSONAL INFORMATION

## Gianguido Dall'Agata

📍 Dipartimento di Fisica e Astronomia "Galileo Galilei", Università degli Studi di Padova, Via Marzolo, 8, 35131 Padova, Italy

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Nationality Italian

PROFESSIONAL EXPERIENCE

February 2016–present **Full Professor**

(FIS/02: Theoretical Physics and Mathematical Methods), Università degli Studi di Padova, Padova, Italy.

August 2015/September 2015 CNRS Associated Researcher, CPHT, Ecole Polytechnique, Paris, France.

March 2011–January 2016 Professore Associato (FIS/02: Theoretical Physics and Mathematical Methods), Università degli Studi di Padova, Padova, Italy.

Sept. 2009/Jan.–Feb. 2010 CNRS Associated Researcher, LPT, Ecole Normale Supérieure, Paris, France.

October 2006–February 2011 Ricercatore (FIS/02: Theoretical Physics and Mathematical Methods), Università degli Studi di Padova, Padova, Italy.

October 2004–September 2006 CERN Fellowship, CERN, Geneva, Switzerland.

October 2002–September 2004 PostDoctoral Fellowship of the DFG at the Physics Department (Research group of Dieter Lüst) of the von Humboldt University of Berlin, Germany.

October 2000–September 2002 PostDoctoral Fellowship of the EU under RTN contract HPRN-CT-2000-00131 "The quantum structure of spacetime and the geometric nature of fundamental interactions" at the Physics Department (Research group of Dieter Lüst) of the von Humboldt University of Berlin, Germany.

EDUCATION

October 1997–December 2000 Ph. D. in Physics at the Dipartimento di Fisica Teorica, University of Turin, Italy.

TEACHING AND ACADEMIA

### Students

Ph.D.

2015/16–2017/18 [N. Cribiori](#), then postdoc at TU Wien.

2010/11–2012/13 [G. Inverso](#) (co-advisor with M. Bianchi), then postdoc at NIKHEF, ITP Lisboa and Queen Mary U. London.

2008/09–2010/11 [A. Gnechhi](#), then postdoc at Utrecht U., Leuven U. and CERN.

Some master and Galilean students *C. Toldo*, postdoc at KITP Santa Barbara, *M. Baggio*, PostDoc in Leuven, *G. Zoccarato*, PostDoc in Wisconsin, *A. de Angelis*, Ph.D. student at Queen Mary, *L. Casarin*, Ph.D. student at AEI Potsdam, *P. Spezzati* and *M. Gorghetto*, Ph.D. students at SISSA.

### Academic roles

2016–today Coordinator of the Ph.D. Course in Physics (Padova University)

2015–today Member of the Department's Directive Board

2011–2015 Deputy Coordinator of the Ph.D. School in Physics (Padova University)

MAIN PRIZES AND GRANTS

SIGRAV Prize 2008 Italian Society of General Relativity and gravitational physics prize to investigators under 35 years of age who gave relevant contributions to gravitational physics.

2012–2016 Italian Ministry of Research - Principal Investigator of the FIR project "String Theory and Fundamental Interactions" (Units Padova and Milano Bicocca).

2011-2013 Padova Uni. - University Project - "de Sitter vacua in supergravity and string theory" (PI).

## COMMISSIONS OF TRUST

Editorial Boards Associate Editor of *Int. J. of Geometric Methods in Modern Physics*.  
 Grant Refereeing Referee for the EPSRC, for the Swiss National Science Foundation, for the Belgian FWO, for the Netherlands Organisation for Scientific Research and for the Italian Ministry of Research (SIR grants, Rita Levi Montalcini Grants).  
 Referee for the Italian Research and University Evaluation Agency (ANVUR)

## PUBLICATIONS

Detail I published 60 research articles and 13 conference proceedings. To date they received about 3900 inSPIRE citations, 10 papers with more than 100 citations, other 22 with more than 50 citations, for an overall  $h = 37$ . The full list is available at <https://inspirehep.net/search?ln=en&ln=en&p=a+dall%27agata%2Cg>.

10 Most relevant publications

1. A. Ceresole, G. Dall'Agata, R. D'Auria and S. Ferrara, *Spectrum of type IIB supergravity on  $AdS_5 \times T^{11}$ : Predictions on  $N = 1$  SCFT's*, Phys. Rev. D **61**, 066001 (2000) [[hep-th/9905226](#)].
2. A. Ceresole and G. Dall'Agata, *General matter coupled  $N = 2, D = 5$  gauged supergravity*, Nucl. Phys. B **585**, 143 (2000) [[hep-th/0004111](#)].
3. G. Dall'Agata, *Type IIB supergravity compactified on a Calabi-Yau manifold with H-fluxes*, JHEP **0111**, 005 (2001), [[hep-th/0107264](#)].
4. G. L. Cardoso, G. Curio, G. Dall'Agata, D. Lüst, P. Manousselis and G. Zoupanos, *Non-Kaehler string backgrounds and their five torsion classes*, Nucl. Phys. B **652**, 5 (2003) [[hep-th/0211118](#)].
5. G. L. Cardoso, G. Curio, G. Dall'Agata and D. Lüst, *BPS action and superpotential for heterotic string compactifications with fluxes*, JHEP **0310** (2003) 004 [[hep-th/0306088](#)].
6. A. Ceresole and G. Dall'Agata, *"Flow equations for non-BPS extremal black holes,"* JHEP **0703** (2007) 110 [[arXiv:hep-th/0702088](#)].
7. G. Dall'Agata and A. Gnechchi, *"Flow equations and attractors for black holes in  $N = 2$   $U(1)$  gauged supergravity,"* JHEP **1103** (2011) 037 [[arXiv:1012.3756](#) [[hep-th](#)]].
8. G. Dall'Agata, G. Inverso and M. Trigiante, *"Evidence for a family of  $SO(8)$  gauged supergravity theories,"* Phys. Rev. Lett. **109** (2012) 201301. [[arXiv:1209.0760](#) [[hep-th](#)]].
9. G. Dall'Agata, F. Zwirner, *"On sgoldstino-less supergravity models of inflation,"* JHEP **1412** (2014)172 [[arXiv:1411.2605](#) [[hep-th](#)]].
10. G. Dall'Agata, E. Dudas and F. Farakos, *"On the origin of constrained superfields" JHEP 1605 (2016) 041* [[arXiv:1603.03416](#) [[hep-th](#)]].

# Contact

**Name**

Fabio Maltoni

**Position**

Professor

**Email**

[fabio.maltoni@uclouvain.be](mailto:fabio.maltoni@uclouvain.be)

**Address**

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Université catholique de Louvain  
2, Chemin du Cyclotron - Box L7.01.05  
B-1348 Louvain-la-Neuve  
Belgium

**Phone**

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**Office**

[E.247](#)

**My personal homepage**

<http://maltoni.home.cern.ch>

**UCL member card**

<http://www.uclouvain.be/fabio.maltoni>

# Teaching at UCL

**Quantum Mechanics**

[PHY1222](#)

First course on Quantum Mechanics.  
45h+30h, 5 ECTS

**Relativistic Quantum Mechanics**

[PHY2125](#)

Introduction to the Dirac Equation.  
15h+15h, 4 ECTS

### **Electroweak interactions**

#### [PHY2224](#)

Introduction to the Standard Model of the electroweak interactions.  
22.5h, 4 ECTS (shared with J.M.Gerard)

### **Strong interactions and symmetries**

#### [PHY2223](#)

Introduction to perturbative QCD and symmetries  
30h, 5 ECTS (shared with J.M.Gerard)

### **Seminars of theoretical and mathematical physics**

#### PHY2501

Invited lectures on special topics.  
15h, 2 ECTS.

## **People responsibilities**

### **Research scientists**

[Olivier Mattelaer](#) (UCL), member since September 2005

Responsible software maintenance and development of MadGraph 5, AMC@NLO (including MadSpin and ALOHA). Study of new experimental approaches using the matrix element re-weighting.

### **Postdocs**

[Jan Heisig](#),

[Michele Lucente](#) (H2020-MSCA-IF-2016), member since January 2016

I work on extensions of the Standard Model of particle physics aimed at accounting for the observed neutrino masses and flavour mixing, the origin of the baryon asymmetry of the Universe and the nature of dark matter. I am currently developing a new computer tool (MadbaM) devoted to precision computations of the baryon asymmetry of the Universe in beyond the Standard Model realisations.

[Manoj Kumar Mandal](#), member since October 2016

[Ken Mimasu](#) (PAI, MSCA), member since October 2016

Collider phenomenology beyond the Standard Model, particularly on extended scalar sectors (two-Higgs doublet models, axion-like particles). Probing the Electroweak phase transition at the LHC. Confronting Baryogenesis via a strong electroweak phase transition with collider signatures at the LHC and beyond. Precision Higgs measurements and global fits in the framework of effective field theory.

[Liam Moore](#), member since December 2016

I work on Top Quark Phenomenology in the Standard Model Effective Field Theory, and the development of the FeynRules package.

[Ambresh Shivaji](#) (Move-In Louvain), member since September 2016

I work in the area of collider physics. My current research interests include phenomenology of loop-induced processes in the SM and beyond, higher order quantum corrections and model independent approach to the study of new physics effects (mainly in the Higgs sector) at colliders.

## Visitors

[Federico Ambrogi](#),

[Roberto Franceschini](#), member since October 2017

Probing fundamental interactions ...

[Alexander Held](#),

[Prasanna Kumar Dhani](#),

[Antonio Santos](#),

BSM physics and dark matter.

## PhD students

[Luca Mantani](#) (MCnetITN3), member since September 2016

I work on LHC phenomenology, in particular how to detect new interactions among SM and interpret them via the SMEFT.

[Xiaoran Zhao](#) (MCnetITN3), member since April 2017

Higgs phenomenology.

## Master students

[Antonio Del donno](#),

[Show former members](#)

# Research statement

The high energy and luminosity of the present and future colliders, from the Tevatron (FNAL) to the Large Hadron Collider (CERN) to a Tev Linear Collider, will offer the widest range of physics opportunities to the exploration of the high-energy frontier. Among the highest priorities is understanding not only the nature of the electroweak symmetry breaking (EWSB) but also the mechanism through which the electroweak scale stabilizes. Simple and very robust arguments indicate that this scale should be less than one TeV, very much in the reach of the above mentioned colliders. At this energy, spectacular events take place and multijet final states in association with leptons or missing energy constitutes the most interesting data samples. The quest for the Higgs boson(s) and/or for supersymmetric particles will rely on our ability of predicting both the signal and the standard model processes which are the backgrounds of these searches.

The difficulty of detecting such signatures asks for a dedicated and joint effort of all the high-energy physics community. Not only the best theoretical predictions for the expected signals will be necessary, but also a very good understanding of the large QCD backgrounds and the detectors responses will allow us to unveil the mechanism of EWSB. In this respect, I consider of primary importance for theorists to work in close contact with experimentalists.

In the next crucial years which will see the first new data from the LHC, I plan to focus my efforts in two main directions:

1. provide new and/or more precise evaluations of the most important signatures that probe the the EWSB mechanism, such as top and Higgs boson(s) production both in the standard model and its extensions.
2. provide the experimentalists at the colliders with the means to simulate events occurring at the energy frontier.

## Projects

**I am involved in the following research directions:**

[Phenomenology of elementary particles](#)

[Data analysis in HEP experiments](#)

[CMS](#)

### **Advanced Multi-Variate Analysis for New Physics Searches at the LHC**

[\[link\]](#)

With the 2012 discovery of the Higgs boson at the Large Hadron Collider, LHC, the Standard Model of particle physics has been completed, emerging as a most successful description of matter at the smallest distance scales. But as is always the case, the observation of this particle has also heralded the dawn of a new era in the field: particle physics is now turning to the mysteries posed by the presence of dark matter in the universe, as well as the very existence of the Higgs. The upcoming run of the LHC at 13 TeV will probe possible answers to both issues, providing detailed measurements of the properties of the Higgs and extending significantly the sensitivity to new phenomena.

Since the LHC is the only accelerator currently exploring the energy frontier, it is imperative that the analyses of the collected data use the most powerful possible techniques. In recent years several analyses have utilized multi-variate analysis techniques, obtaining higher sensitivity; yet there is ample room for further improvement. With our program we will import and specialize the most powerful advanced statistical learning techniques to data analyses at the LHC, with the objective of maximizing the chance of new physics discoveries.

We are part of a network of European institutions whose goal is to foster the development and exploitation of Advanced Multi-Variate Analysis (AMVA) for New Physics searches. The network offers extensive training in both physics and advanced analysis techniques to graduate students, focusing on providing them with the know-how and the experience to boost their career prospects in and outside academia. The network develops ties with non-academic partners for the creation of interdisciplinary software tools, allowing a successful knowledge transfer in both directions. The network studies innovative techniques and identifies their suitability to problems encountered in searches for new physics at the LHC and detailed studies of the Higgs boson sector.

External collaborators: University of Oxford, INFN, University of Padova, Université Blaise Pascal, LIP, IASA, CERN, UCI, EPFL, B12 Consulting, SDG Consulting, Yandex, MathWorks.

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### **Complementarity of dark matter searches in simplified models**

Study of the complementarity between dark matter relic abundance, direct detection, indirect detection and collider searches applied to the dark matter simplified models. These models consider a dark matter candidate communicating to the quark (especially top) sector of the standard model via a bosonic or vectorial mediator.

External collaborators: Eric Conte (GPRHE), Benjamin Fuks (LPTHE), Jun Guo (Chinese Academy of Science), Jan Heisig (RWTH), Kentarou Mawatari (LPSC Grenoble), Michael Kraemer (RWTH), Mathieu Pellen (University of Wuerzburg).

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## **EFT@NLO**

Implementation of the SMEFT at NLO in QCD in the Feynrules MadGraph5\_aMC@NLO chain and phenomenological studies

External collaborators: Cen Zhang, Celine Degrande.

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## **Electroweak corrections**

Automation of the calculation of NLO Electroweak corrections and phenomenological studies of their impact on Standard-Model and Beyond-the-Standard-Model processes at colliders.

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## **FeynRules**

[\[link\]](#)

An automated framework for BSM phenomenology that allows one to compute Feynman rules from a Lagrangian.

External collaborators: Céline Degrande (CERN) Benjamin Fuks (Jussieu).

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## **Higgs phenomenology at the LHC**

[\[link\]](#)

We study the Vector Boson Fusion production channel for the Higgs boson and other particles at the LHC, mainly focusing on the role of QCD corrections.

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## **Loop-induced processes in the SM and Beyond**

Automation within MadGraph5\_aMC@NLO and phenomenological studies of loop-induced processes for the LHC

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## **MadGraph5\_aMC@NLO**

[\[link\]](#)

Monte Carlo development.

External collaborators: Benjamin Fuks, Kentarou Mawatari, Kaoru Hagiwara, Tim Stelzer, Stefano Frixione, Marco Zaro, Rikkert Frederix, Valentin Hirschi, Paolo Torrielli, Johan Alwall, Hua-Sheng Shao, Mihailo Backovic,...

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## **Search for nonresonant Higgs boson pair production in the $l\bar{l}b\bar{b}+MET$ final state**

The discovery of a Higgs boson (H) by the ATLAS and CMS experiments fixes the value of the self-coupling  $\lambda$  in the scalar potential whose form is determined by the symmetries of the Standard Model and the requirement of renormalisability. Higgs boson pair production is sensitive to the self-coupling and will play a major role in investigating the scalar potential structure.

This project consists in a search for nonresonant Higgs boson pair production via gluon fusion in the final state with two leptons, two b jets and missing transverse energy  $gg \rightarrow H(bb) H(WW)$  asking for the leptonic decay of the W's. The analysis is conducted in close collaboration with phenomenologists to ensure the approach is theoretically sound and future-proof.

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## **Study of processes with heavy quarks in the initial state**

The difference between predictions obtained with a massive scheme, where a heavy quark is treated as a final massive state and the massless scheme, where the heavy quark is viewed as an initial parton may be extremely sizable. The aim of the project is to gain a better understanding of the size of the collinear logarithms arising when a heavy quark is treated as a final massive state and to investigate its kinematical origin.

External collaborators: Maria Ubiali, Giovanni Ridolfi.

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[Show past projects.](#)

## Publications in CP3

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**2018**

### **Event generation for beam dump experiments**

*L. Buonocore, C. Frugiuele, F. Maltoni, O. Mattelaer, F. Tramontano*

Refereed paper. 3rd December.

### **Probing the scalar potential via double Higgs boson production at hadron colliders**

*Borowka, Sophia and Duhr, Claude and Maltoni, Fabio and Pagani, Davide and Shivaji, Ambresh and Zhao, Xiaoran*

[\[Abstract\]](#) [\[PDE\]](#)

Refereed paper. 29th November.

### **Top-Yukawa contributions to bbH production at the LHC**

*Nicolas Deutschmann, Fabio Maltoni, Marius Wiesemann, and Marco Zaro*

Refereed paper. 31st July.

### **Constraining anomalous gluon self-interactions at the LHC: a reappraisal**

*Valentin Hirschi, Fabio Maltoni, Ioannis Tsinikos, Eleni Vryonidou*

[\[Abstract\]](#) [\[PDE\]](#) [\[Journal\]](#)

Refereed paper. 12th June.

### **MadDM v.3.0: a Comprehensive Tool for Dark Matter Studies**

*F. Ambrogj, C. Arina, M. Backovic, J. Heisig, F. Maltoni, L. Mantani, O. Mattelaer, G. Mohlabeng*

[\[Abstract\]](#) [\[PDE\]](#)

Refereed paper. 30th March.



## CURRICULUM VITAE of LAURA ELISA MARCUCCI

**Present Address** Dipartimento di Fisica “E. Fermi”,  
Università di Pisa,  
Largo B. Pontecorvo, 3  
56127 PISA  
**Telephone** +39-050-2214901  
**E-mail address** laura.elisa.marcucci@unipi.it

### Personal Data

**Date and Place of Birth** 12/12/1971, Lucca (Italy)  
**Nationality** Italian  
**Marital Status** Married, mother of two daughters

### Academic History

**1/2015** “Abilitazione Scientifica Nazionale” as Full Professor  
**1/2014** “Abilitazione Scientifica Nazionale” as Associate Professor  
**6/2000** Ph.D. in Theoretical Nuclear Physics:  
Physics Department, Old Dominion University, Norfolk, Virginia, USA  
Advisor: Prof. **R. Schiavilla**; Thesis: **Electroweak Structure of  $A=3$  and 4 Nuclei**  
**11/1995** Laurea in Physics:  
Physics Department, University of Pisa, Pisa, Italy  
Advisor: Prof. **S. Rosati**; Thesis: **Calcolo Accurato dei Nuclei con  $A=3$**   
grade 110/110 *summa cum laude*  
**10/1995** Diploma in Piano:  
Istituto Musicale “L. Boccherini”, Lucca, Italy  
grade 7/10  
**7/1990** High School Graduation:  
Liceo Classico “N. Machiavelli”, Lucca, Italy  
grade 60/60

### Awards

**3/2000** **Winner of the “Luise Meyer-Schutzmeister” Prize** as best female graduate student in physics in the USA  
**since 11/2014** **Fellow of the American Physical Society**, “*For advancing the understanding of electroweak interactions in nuclei, particularly for precise studies of low-energy radiative and weak capture processes of astrophysical relevance in the few-nucleon systems.*”

### Professional Experience

**01/2016-present** Associate Professor, Physics Department, University of Pisa, Pisa, Italy  
**10/2002-12/2015** “Ricercatore”, Physics Department, University of Pisa, Pisa, Italy  
**10/2000-9/2002** “Assegnista di ricerca”, Physics Department, University of Pisa, Pisa, Italy  
**6/1996-6/2000** “Graduate Research Assistant”, Physics Department, Old Dominion University, Norfolk, Virginia, USA

## Publication Records (from ISI/WoS, August 27th, 2018)

70 articles on peer-reviewed journals  
4 review articles (1 on Rev. Mod. Phys.)  
38 conference proceedings  
2077 citations (1644 without self-citations)  
26 h-index

## Talks in the Period 2012-2018

**Ab initio calculations of few-nucleon reactions of astrophysical interest** (*invited talk*),  
Castiglione Fiorentino Workshop: New Frontiers in Nuclear Astrophysics,  
Castiglione Fiorentino (Italy), June 2012

**Theoretical studies of muon capture on light nuclei** (*invited talk*),  
The 7th International Workshop on Chiral Dynamics, Jefferson Lab, Newport News (USA),  
August 2012

**Descrizione ab initio di sistemi a pochi nucleoni** (*invited talk*),  
Incontro Nazionale di Fisica Nucleare 2012, Catania (Italy), November 2012

**Electroweak structure of light nuclei within chiral effective field theory** (*invited talk in plenary session*),

22th European Conference on Few-Body Problems in Physics, Cracow (Poland), September 2013

**The proton-proton weak capture reaction within chiral effective field theory**,  
XIV Convegno su Problemi di Fisica Nucleare Teorica, Cortona (Italy), October 2013

**Electroweak structure of light nuclei** (*invited talk*),  
11th International Spring Seminar on Nuclear Physics,  
Ischia (Italy), May 2014

**Playing with few-nucleon systems** (*invited talk*),  
Future Directions in the Physics of Nuclei at Low Energies,  
ECT\*-Trento (Italy), May 2014

**The  $p + d \rightarrow {}^3\text{He} + \gamma$  reaction: an opportunity for nuclear theorists** (*invited talk*),  
LUNA General Meeting,  
LNGS - Assergi (Italy), December 2014

**Ab-initio calculations of few-nucleon reactions of astrophysical interest** (*invited talk*),  
VIII Incontro dei Gruppi Italiani di Astrofisica Nucleare Teorica e Sperimentale,  
Padova (Italy), April 2015

**Recent progress in ab-initio studies of low-energy few-nucleon reactions of astrophysical interest** (*invited talk*),  
XV Convegno su Problemi di Fisica Nucleare Teorica, Pisa (Italy), April 2016

**Recent progress in ab-initio studies of low-energy few-nucleon reactions of astrophysical interest** (*invited talk*),

23th European Conference on Few-Body Problems in Physics, Aarhus (Denmark), August 2016

**Theoretical study of the  $\alpha + d \rightarrow {}^6\text{Li} + \gamma$  radiative capture and its implications for Big Bang Nucleosynthesis**,

XVI Convegno su Problemi di Fisica Nucleare Teorica, Cortona (Italy), October 2017

**Few-Nucleon Reaction of Astrophysical Interest: a Review**,

15th International Symposium on Nuclei in the Cosmos, LNGS, Assergi (Italy), June 2018

**Momentum Distributions and Short-Range Correlations in  ${}^3\text{He}$  with Phenomenological and Chiral Potentials**

XXII International Conference on Few-Body Problems in Physics, Caen (France), July 2018

## Conferences and Workshops Organization

**XI Convegno su Problemi di Fisica Nucleare Teorica**, Cortona (Italy), October 2006

**The 20th European Conference and Few-Body Problems in Physics**, Pisa (Italy), September 2007

**Electron-Nucleus Scattering X**, Marciana Marina (Isola d'Elba - Italy), June 2008

**XII Convegno su Problemi di Fisica Nucleare Teorica**, Cortona (Italy), October 2008

Leader of the working group on the *hep* reaction at the workshop **Solar Fusion Cross Sections for the pp chain and CNO cycle**, INT, University of Washington, Seattle, USA, January 2009  
See E.G. Adelberger et al., Rev. Mod. Phys. 83, 195 (2011)

**Electron-Nucleus Scattering XI**, Marciana Marina (Isola d'Elba - Italy), June 2010

**XIII Convegno su Problemi di Fisica Nucleare Teorica**, Cortona (Italy), April 2011

**Electron-Nucleus Scattering XII**, Marciana Marina (Isola d'Elba - Italy), June 2012

**XIV Convegno su Problemi di Fisica Nucleare Teorica**, Cortona (Italy), October 2013

**Electron-Nucleus Scattering XIII**, Marciana Marina (Isola d'Elba - Italy), June 2014

**CHIRAL DYNAMICS 2015 - The 8th International Workshop on Chiral Dynamics**  
(*Co-chair of the organizing committee*), Pisa (Italy), June 2015

**Re-writing Nuclear Physics textbooks: 30 years of radioactive ion beam physics**  
Pisa (Italy), July 2015

**XV Convegno su Problemi di Fisica Nucleare Teorica**, Pisa (Italy), April 2016

**Lepton-Nucleus Scattering XIV**, Marciana Marina (Isola d'Elba - Italy), June 2016

**Summer School 2017: Rewriting Nuclear Physics Textbooks: Basic nuclear interactions and their link to nuclear processes in the cosmos and on earth**  
Pisa (Italy), July 2017

**XVI Convegno su Problemi di Fisica Nucleare Teorica**, Cortona (Italy), October 2017

Editor of the proceedings for the Cortona workshop series and for the International Congress *Chiral Dynamics 2015*.

Member of the **International Program Committee** of the 15th International Symposium on Nuclei in the Cosmos (NIC2018), which will be held at the Laboratori Nazionali del Gran Sasso, Assergi (Italy) in June 2018

Member of the **International Advisory Committee** of the **CHIRAL DYNAMICS 2018 - The 9th International Workshop on Chiral Dynamics**, which will be held at TUNL, Durham (USA) in September 2018

Member of the **International Advisory Committee** of the **2019 International Nuclear Physics Conference (INPC2019)**, which will be held in Glasgow (UK) in July-August 2019

**Specialy Chief Editor** for the Journal **Frontiers in Physics - Nuclear Physics Section** (see <https://www.frontiersin.org/journals/physics/sections/nuclear-physics#about>)

**Referee for more than 10 International peer-reviewed Journals**, among which Astronomy and Astrophysics, Few-Body Systems, Journal of Physics G: Nuclear and Particle Physics, Nuclear Physics A, Physical Review C, and Physical Review Letters.

Referee for the evaluation of grants proposal at the Department of Energy - USA and at the Natural Sciences and Engineering Research Council of Canada (NSERC)

## Administratives Duties

Member of the *Commissione Scientifica d'area 02 - Scienze Fisiche*, University of Pisa, 2009-2012  
Member of the *Comitato Ordinatore della Scuola di Specializzazione in Fisica Medica*, University of Pisa, 2009-2014  
Member of the *giunta* of the Physics Department at the Univ. of Pisa, 2013-2016  
Local coordinator for the INFN Pisa branch of the *iniziativa specifica* “Few-Body Systems: Structure and Reactions with Light Nuclei” (FBS), since January 2014

## Teaching Activity

Lecturer for the course **Nuclear Astrophysics** at the Gran Sasso Science Institute - Center of Advanced Studies - INFN (L'Aquila), for the PhD course in Astroparticle Physics, academic years 2013/2014, 2014/2015, 2015/2016, 2016/2017, and 2017/2018.

Teaching Activity at the University of Pisa since 2002

“Esercitatore” of the course **Fisica 1**, *laurea* in Physics, academic years 2002/2003, 2003/2004, 2004/2005, 2005/2006, 2009/2010, 2010/2011, 2016/2017

Lecturer of the course **Fisica 1**, *laurea* in Physics, academic years 2017/2018

Lecturer of the course **Fisica**, *laurea* in Computer Science, academic years 2006/2007 and 2007/2008

Co-Lecturer of the course **Fisica 1 + Esercitazioni**, *laurea* in Chemistry, academic year 2016/2017

Co-Lecturer of the course **Fisica 3**, *laurea* in Physics, academic years 2015/2016 and 2016/2017

Lecturer of the course **Reazioni nucleari di interesse astrofisico** (3 CFU), *laurea specialistica in Scienze Fisiche*, academic years 2004/2005, 2005/2006, 2006/2007

Lecturer of the course **Reazioni nucleari di interesse astrofisico** (6 CFU, becoming 9 from the academic year 2013/2014), *laurea magistrale in Fisica*, academic years 2009/2010, 2011/2012, 2012/2013, 2013/2014, 2014/2015, 2015/2016, 2016/2017, 2017/2018

Lecturer of the course **Complementi di fisica: modellistica nucleare I**, *scuola di specializzazione in Medical Physics*, academic years 2009/2010, 2010/2011, 2011/2012, 2012/2013, 2016/2017

## Thesis Supervision

- Academic year 2003/2004 *Laurea triennale* - Dott.ssa Erminia Bressi  
Thesis: **Studio teorico della reazione**  $p + d \rightarrow {}^3\text{He} + \gamma$
- Academic year 2005/2006 *Laurea triennale* - Dott.ssa Maria Piarulli  
Thesis: **Studio del fattore di forma del nucleo di  ${}^4\text{He}$**
- Academic year 2005/2006 *Laurea triennale* - Dott.ssa Valentina Fogli  
Thesis: **Studio del fattore di forma magnetico dei nuclei con  $A = 3$**
- Academic year 2007/2008 *Laurea magistrale* - Dott.ssa Maria Piarulli  
Thesis: **Cattura muonica su nucleo di deuterio**
- Academic year 2009/2010 *Laurea triennale* - Dott. Marco Mariti  
Thesis: **Gli operatori di carica e corrente nucleare**
- Academic year 2015/2016 *Laurea magistrale* - Dott. Alessandro Grassi  
Thesis: **Multipotential analysis of the radiative capture reaction**  $\alpha + d \rightarrow {}^6\text{Li} + \gamma$
- Academic year 2015/2016 *Laurea triennale* - Dott. Luca Genchi  
Thesis: **Il deutone**
- Academic year 2016/2017 *Laurea triennale* - Dott.ssa Silvia Benegiano  
Thesis: **Studio teorico della reazione**  $p + p \rightarrow d + e^+ + \nu_e$
- Academic year 2016/2017 *Laurea triennale* - Dott. Leonardo Barontini  
Thesis: **Alla scoperta del nucleo atomico: dall'esperimento di Rutherford alla formula semi-empirica di massa**
- Academic year 2016/2017 *Laurea triennale* - Dott.ssa Ambra Frediani  
Thesis: **Studio del fattore di forma nucleare**
- Academic year 2016/2017 *Laurea magistrale* - Dott.ssa Alessia Nannini  
Thesis: **Non-Symmetrized Hyperspherical Harmonics for a three-body system**
- Academic year 2017/2018 *Laurea triennale* - Dott.ssa Luana Modafferi  
Thesis: **La nucleosintesi al Big Bang: reazioni nucleari e abbondanze primordiali**
- Ongoing *Laurea magistrale* - Dott.ssa Ylenia Capitani  
Thesis: **Il metodo delle armoniche ipersferiche per lo studio del continuo**
- Ongoing (co-supervision) *Dottorato presso il GSSI* - Dott. Alex Gnech  
Thesis: **Theoretical study of  $A = 6, 7$  radiative captures**

Pisa, August 27th, 2018

# **CURRICULUM VITAE**

## **GIULIA RICCIARDI**

### **POSIZIONE ATTUALE**

Professore Associato per il settore scientifico-disciplinare FIS/02, Fisica teorica, modelli e metodi matematici, presso il Dipartimento di Fisica E. Pancini dell'Università degli Studi di Napoli Federico II

### **TITOLI ACCADEMICI**

#### **Scuola Normale Superiore di Pisa**

Diploma di Perfezionamento in Fisica teorica (equipollente al diploma di dottorato di ricerca), votazione 70/70 e lode.

#### **Università degli Studi di Napoli "Federico II"**

Laurea quadriennale in fisica, votazione 110/110 e lode.

### **PRINCIPALI ATTIVITA' DI RICERCA POST-LAUREAM**

#### ***Estero***

- Harvard University (Cambridge, Ma, U.S.A.)
  - Ricercatore associato
  - Post-doctoral fellow
- Attività di ricerca in fisica teorica presso Nikhef, Amsterdam (Paesi Bassi), Technical University Munich (TUM), Monaco (Germania), Laboratoire de Physique Théorique de l'Université de Paris XI, Centre d'Orsay (Francia), Divisione teorica del CERN, Ginevra (Svizzera), Brookhaven National Laboratory, Department of Physics, Upton, (USA)

#### ***Italia***

- Dipartimento di Fisica dell'Università degli Studi di Napoli "Federico II":
  - Ricercatore Universitario
  - Post-dottorato
- Dipartimento di Fisica dell'Università degli Studi di Roma "La Sapienza": Borsa di studio
- Scuola Normale Superiore di Pisa: Scuola di Perfezionamento triennale (equipollente al dottorato di ricerca)

### **ATTIVITA' DIDATTICA**

Relatore e correlatore, in Italia e all'estero, di tesi di laurea magistrale e di dottorato

#### ***Italia***

- Università degli Studi di Napoli "Federico II":

- Esercitazioni
  - *Meccanica quantistica, Metodi matematici per la Fisica*, Dipartimento di Fisica
- Corsi
  - *Fisica teorica subnucleare, Metodi di quantizzazione, Fisica generale I, Fisica teorica, Introduction to neutrino physics, Heavy flavours physics, Physics of strong interactions*, Dipartimento di Fisica
  - *Fisica I*, Scuola Politecnica e delle scienze di base

### *Estero*

- Corsi
  - Harish-Chandra Research Institute, Allahabad, India
    - *Flavour Physics*
  - Universidad de la Laguna, Tenerife, Spagna
    - *Nuclear and Particle Physics, Quantum mechanics, Quantum Chromodynamics*
  - Institut Henri Poincaré, Parigi, Francia
    - *GDR-Intensity lectures  $V_{cb}$*

### *Lectures*

- School in Applications of Effective Field Theories, Università di Milano, *The Structure Function of Heavy Flavor Decays*

### PREMI

- premio SIF per la produzione scientifica in Fisica
- premio Antonio Stanghellini ("Ettore Majorana" Foundation and CSS – Erice)
- premio Jun J. Sakurai ("Ettore Majorana" Foundation and CSS – Erice)

### ABILITAZIONE SCIENTIFICA NAZIONALE

Abilitata prima fascia 02/A2

### PRINCIPALI RESPONSABILITA' SCIENTIFICHE

Ha svolto e/o svolge funzioni di

- Chairperson e membro del Comitato scientifico di Conferenze, Workshops, Istituti di fisica teorica e Scuole di fisica
- Coordinatore progetto di ricerca (Principal investigator) e revisore esterno per progetti di ricerca erogati da Istituzioni Universitarie e Enti di ricerca italiane ed estere (VQR, FIRB, NSERC (Canada),...)
- Responsabile locale ISN INFN e di progetto Erasmus
- Co-Editore di Atti di Conferenze e membro comitato redazionale
- Membro Collegio dei docenti di Dottorato in Fisica della Università di Napoli Federico II

- Commissario per valutazioni comparative, borse e assegni di ricerca, dottorato (INFN, Università italiane e estere)
- Membro Consiglio Direttivo Associazione Normalisti, socio vitalizio Associazione Normalista e Società italiana di relatività generale e fisica della gravitazione (SIGRAV)

## DIVULGAZIONE SCIENTIFICA

- Seminari divulgativi INFN presso la Città della Scienza, Napoli, Italia
- Co-organizzatore (2016, 2011) Fisica in barca, attività di outreach dipartimentale e INFN verso gli studenti delle Scuole Superiori
- Articoli di divulgazione scientifica

## SEMINARI RECENTI

### 2018

-Conferenza Internazionale *XIIIth Quark Confinement and the Hadron Spectrum*, Maynooth, Irlanda

-*Lio International Conference on Flavour Physics "From Flavour to New Physics"*, Lyon, Francia

### 2017

- *Sixth International Conference on New Frontiers in Physics (ICNFP2017)*, Kolymbari, Grecia

### 2016

-Conferenza Internazionale *XIIth Quark Confinement and the Hadron Spectrum*, Salonicco, Grecia

-Sixth International Workshop on *Theory, Phenomenology and experiments in flavour Physics*, Anacapri, Italia

### 2015

-*LIO international conference on Flavour, Composite models and Dark matter*, IPNL (Institut de Physique Nucleaire de Lyon), Lione, Francia

-*3<sup>rd</sup> Belle II Theory Interface Platform (B2TiP) Workshop*, KEK Laboratory, Tsukuba, Giappone

-XIV Marcel Grossmann Meeting (MG14) *Recent developments in theoretical and experimental general relativity, astrophysics and relativistic field theories*, Università di Roma "Sapienza", Roma, Italia

### 2014

-Xth Workshop on B Physics *The landscape of Flavor Physics towards the high intensity era*, Scuola Normale Superiore, Pisa, Italia

-Workshop *Effective field theories for collider physics, flavor phenomena and electroweak symmetry breaking*, Schloss Waldthausen, Budenheim, Germania

-Workshop *Lattice meets Continuum: QCD calculations in flavour physics*, Kulturhaus Lyz, Siegen, Germania

-Conferenza Internazionale *XIth Quark Confinement and the Hadron Spectrum*, San Pietroburgo, Federazione Russa

-XXI Conferenza *SIGRAV Relatività Generale e Fisica della Gravitazione*, Alessandria, Italia,

-Fifth International Workshop on *Theory, Phenomenology and experiments in flavour Physics*, Anacapri, Italia

-Workshop on *B-Physics: Theory meets Experiment*, Nikhef, Amsterdam, Paesi Bassi

## PRICIPALI LINEE DI RICERCA

- Fisica teorica subnucleare, teoria dei campi



- Fisica del flavour
- QCD fenomenologia e teoria
- Spettroscopia e fisica esotica
- Leptogenesi e fisica del neutrini

# Curriculum Vitæ

**Francesco Vissani**

**Laboratori Nazionali del Gran Sasso  
S.S. 17 bis, km 18+910  
67010 Assergi (AQ), Italia  
E-mail: [vissani@lngs.infn.it](mailto:vissani@lngs.infn.it)**

## DATA

<i>POSITION</i>	INFN researcher director (dirigente di ricerca) at Gran Sasso National Laboratory
<i>RESEARCH INTERESTS</i>	Astro-particle physics, in particular: very high energy neutrinos and $\gamma$ rays; core collapse supernovae; solar neutrinos; cosmic rays; connections between particle physics and astrophysics; lepto/baryogenesis.  Phenomenology of the extensions of the standard model of elementary particles: Tests of the lepton and baryon numbers. CP violation. Higgs and electroweak interactions. Dark matter.  Manifestations of neutrino masses; flavor oscillations, neutrinoless double beta decay, direct search, other probes of masses, related phenomena.  Grand unified theories, supersymmetric models. Flavor symmetries. Theories of fermion masses.
<i>PERSONALIA</i>	Born in Macerata, on July 14, 1964. Italian citizen. Married with Felicia Cupelli since May 20, 1995. One daughter, Claudia, born on May 26, 1999
<i>FOREIGN LANGUAGES</i>	English (fluent) French, Spanish and Portuguese (written).
<i>COMPUTER SCIENCE</i>	Programming in FORTRAN, MATHEMATICA COBOL with operating systems UNIX, LINUX, VAX, MVS. Use of HTML language.
<i>AWARDS</i>	Occhialini prize and medal (IOP-SIF) London 2008.  Teaching qualification by MIUR (Settore Concorsuale 02/A2, I fascia) Valid from 08/01/2014 to 08/01/2020.

## *EDUCATION AND STUDIES*

1983 Jul	High School Diploma, 60/60, Liceo Scientifico "Galileo Galilei", Macerata.
1983 Oct	Student of Theoretical Physics at Pisa University.
1990 Jul	Graduates in Physics, 110/110. Thesis: CP violation in supersymmetric models Advisor: Riccardo Barbieri.
1991 Oct	Ph D student in Elementary particle sector of SISSA, Trieste.
1993 Mar	Magister Philosophiæ. Thesis: Supersymmetric Grand Unification. Advisor: Stefano Bertolini.
1994 Oct	Philosophiæ Doctor. Thesis: Phenomenological Constraints on Supersymmetric Grand Unification. Advisor: Stefano Bertolini.

## *POSITIONS IN RESEARCH GROUPS*

1995 Oct	Postdoc at ICTP, Trieste.
1996-1997	Organizer of the ICTP cycle of seminars: Informal Seminars on Phenomenology.
1996 Oct	Scientific secretariat of the ICTP conference: Quarks and Leptons: Masses and Mixing
1997 Nov	Postdoc at DESY, Hamburg.
1999 Mar	Visitor at ICTP, Trieste
1999 Sep	Visitor at SISSA, Trieste
1999 Oct	INFN Researcher at Laboratori Nazionali del Gran Sasso, ex art. 23.
2003 Feb	Winner of national competition for junior staff position at Laboratori Nazionali del Gran Sasso, INFN.
2000-2005	Organizer of LNGS Series of Seminars [with A.Di Credico, O.Palamara, Cattadori]
2008 Jun	Winner of national competition for senior staff position at Laboratori Nazionali del Gran Sasso, INFN.
2008-2014	Organizer of LNGS Series of Seminars

- 2012-2018                      Coordinator of the PhD in Astroparticle Physics and research at the Gran Sasso Science Institute (GSSI) L'Aquila.
- 2016 Dec                        Winner of national competition as research director at Laboratori Nazionali del Gran Sasso, INFN.

*ORGANIZATION OF INTERNATIONAL EVENTS*

- 2001 Mar                        Organizer of the Workshop at LNGS:  
Solar Neutrinos: Where are the Oscillations?  
[with V.Berezinsky]
- 2001 Jul                        Convener of the session: Particle Astrophysics  
and Cosmology of the Internat. Conf.  
HEP 2001 (Budapest) [with S.Cooper]
- 2002 Jun                        Organizer of the Summer School of  
astroparticle physics cosmology at ICTP  
[with G.Senjanovic, G.Dvali *etal* ]
- 2002 Jul                        Organizer of Summer Institute at LNGS:  
New Dimensions in Astroparticle Physics  
[with Z.Berezhiani, V.Berezinsky *etal* ]
- 2002 Nov                        Convener of the theory session for:  
Double Beta Decay Meeting at Gran Sasso  
[with M.Pavan]
- 2003 Sep                        Organizer of the Conference: Hierarchy problems  
in 4 and more dimensions at ICTP  
[with R.Barbieri, G.Senjanovic, *etal* ]
- 2004 Jun-Jul                    Organizer of the Summer School  
of astroparticle physics and cosmology at ICTP  
[with G.Senjanovic, G.Dvali *etal* ]
- 2004 Aug-Sep                   Organizer of the Summer Institute at LNGS:  
Particles, Gravity and Cosmology  
[with Z.Berezhiani *etal* ]
- 2004 Sep                        Convener of the session on Double Beta  
at the workshop NOW2004, Otranto  
[with A.Giuliani]
- 2005 May                        Organizer of the Conference PLANCK05  
at ICTP, Trieste  
[with G.Senjanovic *etal* ]
- 2007 Jul                        Organizer of the Workshop on GUT & p-decay  
at ICTP, Trieste  
[with G.Senjanovic *etal* ]
- 2008 Jun                        Organizer of the International School  
"Enrico Fermi" SIF (Varenna)

	Measurements of neutrino masses [with F. Ferroni]
2010 Jun	Organizer of the International Workshop “Goranfest: the joy of making physics” in Split, Croatia [with R. Mohapatra <i>etal</i> ]
2013 Jun	Organizer of the International Workshop “From Majorana to LHC” at the ICTP, Trieste [with F. Ferroni <i>etal</i> ]
2014 Oct	Organizer of the International Workshop “Multiple Messengers and Challenges in Astroparticle Physics” at the GSSI, L’Aquila [with E. Coccia <i>etal</i> ]
2018 Jul	Organizer of the International Workshop “Core-collapse Supernovae in the Multi-messenger Era” at the GSSI, L’Aquila [with O. Straniero <i>etal</i> ]

#### TEACHING EXPERIENCES

1995-1996	Grader at the ICTP Diploma course: Standard Model I (N. Paver)
1995-1997	Grader at the ICTP Diploma course: Standard Model II (A.Yu. Smirnov)
1997 Apr-May	Holder of the ICTP Diploma course: Introduction to perturbative QCD
1997 Dec	Lectures on neutrino oscillations for PhD course on Neutrinos at DESY
2001-2002	Holder of the course at L’Aquila University: Introduction to grand unification and supersymmetry
2003-2006	Holder of the course at the University of L’Aquila: Frontiers of the standard model
2005-08, 2010-11	PhD course at Milan University Frontiers of the standard model
2006-2007	Lectures at the PhD course in Catania University: Introduction to neutrino oscillations
2008 Jul	Seminar at the students of Technical University of Munich visiting Gran Sasso Laboratories on: “Discussing the interest in neutrino astronomy”
2008 Sep	Summer School for students of Milan University visiting Gran Sasso. Mini course

	on: "Theoretical aspects of neutrino masses"
2009 Jun	ICTP Summer School on particle physics in the era of LHC. Course on: "Neutrinos"
2012-2017	PhD course at Milan University on "Neutrinos"
2013-2017	PhD course at the GSSI, L'Aquila "Introduction to weak interactions and neutrinos"
2015 May	Course at Instituto Balseiro, Bariloche (Argentina) within Programa Maldacena de Profesores Invitados "Introduction to Supernova Neutrinos"

#### SELECTED CONFERENCES

1995 Sep	Summer Institute on: Signals of Unified Theories, LNGS (seminar on: R-parity Phenomenology).
1995 Sep	5 <sup>th</sup> Hellenic School and Workshops on HEP, Beyond the Standard Model, Corfu, Grecia (seminar on: R-parity Phenomenology).
1996 Jun	4 <sup>th</sup> International Conference on Supersymmetries in Physics (SUSY 96), College Park, Maryland, USA (seminar on: R-parity and Grand Unification).
1996 Oct	Trieste Conference on Quarks and Leptons: Masses and Mixing at ICTP (seminar on: Neutrino Mediated Long Range Forces).
1997 Apr	<i>IX</i> incontro sulla fisica al LEP, PiLEP, Pisa (seminar on: Anomalous Events at HERA).
1997 Aug	Participation in Summer Visiting Program al FERMLAB (Chicago, USA).
1997 Oct	Participation in ICTP activity: Extended Workshop on Highlights on Astroparticle Physics
1998 Jan	WHEPP-5: 5 <sup>th</sup> Workshop on High Energy Physics Phenomenology, Pune, India (seminars on: Neutral Current Interactions and Atmospheric Neutrinos, and on: Baryogenesis via Leptogenesis).
1998 May	Ringberg Euroconference: New trends in Neutrino Physics, Munich, Germany (seminar on: Possible Tests for Atmospheric Neutrinos)
1998 Jul	Participation in Miramare Summer Institute 98 at SISSA of Trieste (seminar on: Neutrino-induced $\mu$ in underground detectors and atmospheric neutrinos)
1998 Sep	Workshop on Physics of Relic Neutrinos at ICTP (seminar on: Some implications of the search for massive neutrinos in cosmology, or, the unimaginative approach to the detection of relic neutrinos)
1999 Sep	Participation in Summer Institute: Massive

	Neutrinos in Physics and Cosmology at LNGS (seminar on: Expectations on the neutrinoless double $\beta$ decay)
1999 Sep	Workshop: $\nu$ ews from the Universe at DESY (seminar on: Expectations on the neutrinoless double $\beta$ decay)
1999 Nov	3 <sup>rd</sup> Workshop on physics and detectors for DAΦNE, at Laboratori Nazionali di Frascati (seminar on: Aspects of CP violation in the leptonic sector)
2000 May	Workshop: Frontier objects in astroparticle and particle physics, Vulcano (ME) (seminar on: What is the standard model of elementary particles and why we have to modify it)
2000 Jun	Partecipazione in the Conferenza: Neutrino 2000, Sudbury, Canada
2000 Jul	The 9th Marcel Grossmann meeting, Rome (seminar on: Is a coherent picture of massive neutrinos emerging?)
2000 Jul	3rd Intern. Conf. on Dark Matter in Astro- and Particle Physics (DARK2000). Heidelberg, Germany (seminar on: The weight of neutrinos and related questions)
2000 Sep	2nd Europhysics Neutrino Oscillation Workshop (NOW 2000) Conca Specchiulla, Otranto (LE) (seminar on: Non-oscillation searches of neutrino mass in the age of oscillations)
2000 Oct	Giornate di Studio su Fisica delle Particelle, Astrofisica e Cosmologia (LNGS, INFN) (seminar on: What we did learn and what we can still learn on neutrinos)
2001 Apr	Poster at the 11 <sup>th</sup> Baksan School on Statistical Approaches to Neutrino Mass Matrices
2001 Jul	Europhysics Conference on HEP (HEP-01) Budapest, Hungary (seminar on: How Neutrino and Charged Fermion Masses Are Connected Within Minimal Supersymmetric SO(10) Model)
2001 Oct	Workshop on Matter antimatter and dark matter, ECT*, Trento (seminar on: Massive neutrinos and theoretical developments)
2002 Mar	Workshop on Neutrinos at Gran Sasso, Padua University (seminar on: Masse di neutrino ed oscillazioni)
2002 May	Congresso di Fisica Teorica di Cortona (seminar on: Oscillations of massive neutrinos)
2002 Jun	ICTP Summer School on astroparticle physics (lecture on: Neutrinos as astrophysical probes)
2002 Oct	Fermilab Workshop: Neutrino News from Lab and Cosmos (seminar on: $0\nu 2\beta$ decay and neutrino masses)
2003 Mar	La Thuile Conference: Results and Perspectives in Particle Physics (Perspectives in neutrino physics)
2003 Jul	International Europhysics Conference on High Energy Physics in Aachen (Neutrino masses: what do they mean?)
2003 Aug	Partecipazione in the Summer Visiting Program at CERN, Geneve
2004 Mar	International Workshop on Neutrino-Nucleus Interactions

	NUINT04 at LNGS (The interest in neutrinos from core collapse supernovae)
2004 Jun	International Workshop on Fundamental Interactions at ECT* (Some questions about neutrinos of fundamental interest - or fundamentally interesting)
2004 Nov	4th Meeting 'EUROgdr Supersymmetry', at LNF, Frascati (summary talk for the working group on 'Flavors and Neutrinos')
2005 Feb	XI International Workshop on 'Neutrino Telescopes', Venezia (talk on Lepton and Quark Masses in $SO_{10}$ )
2005 Mar	Incontri di Fisica delle Alte Energie, Catania (talk on neutrinos from supernovae and SNR)
2005 Apr	Commissione Scientifica Nazionale II, Villa Mondragone (seminar on double beta and neutrino masses)
2006 Feb	Partecipazione in Open Symposium of 'CERN Strategy Group' at LAL, Paris
2006 Mar	Int. Workshop on 'Cryogenic liquid detectors for future particle physics', LNGS, Assergi (seminar on: Remarks on Grand Unification and proton decay)
2006 May	Workshop: Frontier objects in astroparticle and particle physics, Vulcano (ME) (seminar on: Neutrinos from SNR)
2006 Oct	LHC Days in Split Diocletian Palace, Split, Croatia (seminar on: Properties and manifestations of neutrinos)
2006 Oct	CHIPP Workshop on neutrino physics Bern University (opening seminar on Properties and manifestations of neutrinos)
2007 Feb	Conference on 20th Anniversary of SN1987A, Inst. for Nuclear Research, Lebedev Ph.Inst, Moscow (seminar on: Interpretation of SN1987A Neutrinos)
2007 Jun	Int. Workshop on 'CRYODET 2', LNGS, Assergi (seminar on: Theoretical physics scenarios in view of second generation $\nu$ -oscillation and p-decay experiments)
2007 Jun	Rome Int. Conf. on Astroparticle Physics, RICAP07 (seminar on: Cosmic rays and neutrinos from supernova remnants)
2007 Sep	XXVIII ENFCAP – Encontro Nacional de Fisica de Particulas e Campos – Aguas de Lindoya, MG, Brazil (seminar on: Neutrinos from SN1987A 20 years later)
2007 Nov	Commissione Scientifica Nazionale I, Rome, Sede Presidenza INFN (seminar on: An overview of neutrino physics)
2008 Apr	IV International Workshop on: "Neutrino Oscillations in Venice" (seminar on: How much can we learn from SN1987A events?)
2008 Oct	XCIV Congresso Nazionale Societa' Italiana di Fisica, Genova (seminar on: Neutrini al di la' del sole.)
2008 Dec	Commissione Scientifica Nazionale II, Universita' di Bologna (seminar on: Which are the goals of neutrino astronomy?)
2008 Apr	Commissione Scientifica Nazionale II, Pisa (Updates on neutrinos)



2009 Apr	Incontri di Fisica delle Alte Energie, Bari (seminar on: Sugli obiettivi della astronomia neutrinica)
2009 Apr	VESF Council Meeting, Osservatorio di Monte Porzio Catone (seminar on: Neutrinos from supernovae as trigger for GW search)
2009 Sep	Commissione Scientifica Nazionale II, INFN, Rome, discussion on prospects of neutrino astronomy (seminar on: A candidate for observations: RX J1713.7-3946)
2009 Oct	The sun, the stars, the universe and general relativity, (first Galileo-Xu Guangqi meeting), Shanghai, China (seminar on: Potential of neutrino detectors as monitors of gravitational core collapses)
2010 May	Frontier objects in astroparticle and particle physics, Vulcano Workshop (seminar on: What is the issue with SN1987A neutrinos?)
2011 Apr	Multi-Messenger Astronomy of Cosmic Rays, KIAA, Beijing (seminar on: TeV neutrinos from SNR: How to get predictions with error-bars?)
2012 Nov	Exploring the Non-thermal Universe with Gamma Rays, Barcelona (seminar on: High Energy Neutrino Astronomy)
2013 Feb	4th Workshop on Air Shower Detection at High Altitude, Naples (seminar on: High Energy Neutrino Astronomy)
2013 Apr	ORCA Workshop in Paris (seminar on: Mass Hierarchy, Muon Disappearance and Artificial Neutrino Beams)
2014 Feb	La Thuile 2014 (contribution on: Theoretical premises to neutrino round table)
2014 Apr	International School of Space Science L'Aquila (lecture on: Neutrino Masses and Baryogenesis)
2014 Jul	Neutrinos in Astro- and Particle Physics Workshop Munich (seminar on: SN1987A observations: analysis and implications)
2015 Mar	XVI International Workshop on 'Neutrino Telescopes', Venezia (talk on Supernova Neutrinos: Risks and Opportunities)
2017 Oct	17th Int Workshop on Next Generation Nucleon Decay and Neutrino Detectors, Warwick (talk on Neutrinoless-double $\beta$ decay: Motivations, Expectations, Uncertainties)
2018 Mar	ECT* Workshop 'Determination of the absolute electron (anti-)neutrino mass', Trento (talk on Neutrino mass by time-of-flight measurements)
2018 Mar	Fermi-LAT Collaboration Meeting, Pisa (talk on The search for HE cosmic neutrinos; expectations, synergies, results & prospects)
2018 Jun	XXVIII International Conference on Neutrino Physics and Astrophysics, Heidelberg (talk on Neutrino 2018: Messages from a theorist)
2018 Jun	15th International Solar Neutrino Conference,

Dresden (talk on Luminosity constraint and entangled solar neutrino signals)

*SELECTED SEMINARS*

1993 Oct	CP Violating Phases and Electric Dipole of Neutron at ICTP
1994 Jul	$b\tau$ Unification and $\nu_\tau$ mass at ICTP Summer School on Particle Physics.
1995 Oct	R-parity at SISSA, and at Ferrara University.
1996 Mar	R-parity at Saclay, France and Ecole Polytechnique, France.
1997 Jan-Feb	R-parity at CFIF, Lisbon, Portugal; University of Valencia, Spain; NRCSP Democritos, Athens, Greece.
1997 Mar	$e^+p \rightarrow e^+X$ HERA Events at ICTP.
1997 Jun	Anomalous events at HERA at Universita' di Cassino
1997 Dec	Aspects of Neutrino Physics at Universita' of Oxford, UK
1998 Feb	Aspects of Neutrino Physics at Dortmund University, Germany
1998 Apr	What is the Flavor of Atmospheric Neutrinos? at ICTP
1998 Jun	On the recent Super-Kamiokande results and their implications at DESY. Hamburg
1998 Jun	What is the flavor of atmospheric neutrinos? at Scuola Normale Superiore, Pisa
1999 Apr	Beyond the frontiers of the Standard model with atmospheric neutrinos, LNGS
2001 Mar	Statistical Approaches to Neutrino Mass Matrices at ICTP di Trieste
2001 May	On Neutrino Mass Matrices with a Dominant Block at Rome University (La Sapienza)
2001 Jun	What We Learned on Massive Neutrinos at Rome 2 University (Tor Vergata)
2002 May	Implications of neutrino oscillations at Scuola Normale Superiore di Pisa
2003 Jun	The long path from neutrino oscillations to the theory of fermion masses at DESY, Hamburg
2004 May	Neutrinos from gravitational collapse at Lecce University
2004 Dec	Neutrinos from Supernovae and SNR, at Turin University
2005 Nov	Neutrinos from SN and SNR

at Cagliari University

2006 Nov Is there a problem with low energy SN1987A neutrinos? at Rome 1 University

2006 Dec Properties and manifestations of neutrinos, Naples University

2007 Mar Neutrino oscillations and neutrino astronomy, at Bologna Observatory

2007 Oct Neutrinos from SN1987A 20 years later at Campinas University (Brazil)

2007 Nov On SN1987A 20 years later Ferrara University

2008 Sep The events from SN1987A at LNS, Catania

2009 Nov The potential of neutrino detectors as monitors of gravitational core collapses, at IJS, Ljubljana (Slovenia)

2011 Feb Progresses in neutrino astronomy at Rome 2 U. – Tor Vergata

2014 Jun Masse di neutrino e bariogenesi at Naples U.

2015 Mar La domanda di Majorana colloquium at Lecce U.

2016 Apr Open problems in neutrino astronomy talk at APC, Paris

2018 Feb A perspective view of solar neutrino enquiries - circa 2018 talk at Milan U

# Scientific Works of FRANCESCO VISSANI

## Contents

<b>1 Research Papers (91 entries)</b>	<b>11</b>
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## 1 Research Papers (91 entries)

- 1. “Introduction to neutrino astronomy”**  
A. Gallo Rosso, C. Mascaretti, A. Palladino and F. Vissani.  
arXiv:1806.06339 [astro-ph.HE]  
DOI:10.1140/epjp/i2018-12143-6  
Eur. Phys. J. Plus **133**, no. 7, 267 (2018). [HEP entry](#)
- 2. “Supernova neutrino physics with a nuclear emulsion detector”**  
G. De Lellis, A. Di Crescenzo, A. Gallo Rosso, V. Gentile and F. Vissani.  
arXiv:1804.07735 [hep-ph]  
DOI:10.1088/1475-7516/2018/08/015  
JCAP **1808**, no. 08, 015 (2018) [HEP entry](#)
- 3. “The importance of observing astrophysical tau neutrinos”**  
A. Palladino, C. Mascaretti and F. Vissani.  
arXiv:1804.04965 [astro-ph.HE]  
DOI:10.1088/1475-7516/2018/08/004  
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## 6 Citations Summary

Summary of [citations from inSPIRE database](#), generated on August 22, 2018

155 papers found, 143 of them citeable (published or arXiv)

Citation summary results	Citeable papers	Published only
<b>Total number of papers analyzed:</b>	143	85
<b>Total number of citations:</b>	7,818	6,381
<b>Average citations per paper:</b>	54.7	75.1
<b>Breakdown of papers by citations:</b>		
Renowned papers (500+)	2	1
Famous papers (250-499)	4	3
Very well-known papers (100-249)	16	16
Well-known papers (50-99)	21	19
Known papers (10-49)	43	14
Less known papers (1-9)	38	17
Unknown papers (0)	15	2
h-index	44	42

## Collaborators

F. Aharonian, R. Aloisio, C. Aulakh, G. Battistoni, B. Bajc, V.S. Berezinsky, S. Bertolini, C. Brofferio, W. Buchmüller, A. Capone, C. Cattadori, F. Cavanna, S. Celli, M. Cirelli, E. Coccia, M.L. Costantini, L. Covi, A. Datta, G. De Lellis, D. Delepine, S. Dell'Oro, A. Di Crescenzo, A. Drago, S.R. Dugad, A. Esmaili, M. Fabbrichesi, V. Fafone, G. Fantini, A. Ferrari, N. Ferrari, F. Ferroni, F. Feruglio, N. Fornengo, R. Frey, W. Fulgione, A. Gallo Rosso, V. Gentile P.L. Ghia, E. Kemp, A. Ianni, I. Leonor, P. Lipari, C. Lujan-Peschard, A.S. Malguin, G. Marandella, S. Marocci, C. Mascaretti, A. Melfo, M. Mitra, T. Montaruli, B. Mukhopadhyaya, M. Narayan, F. Nesti, C.D. Ott, G. Pagliara, G. Pagliaroli, O. Palamara, A. Palladino, S. Recchia, N. Rius, F. Rossi-Torres, E. Roulet, S. Roy, C. Rubbia, O.G. Ryazhskaya, N. Sahakyan, K. Scholberg, M. Selvi, G. Senjanović, A.Yu. Smirnov, I. Sokalsky, M. Spurio, A. Strumia, M. Viel, F.L. Villante, M.C. Volpe, G.T. Zatsepin, V. Zema, A. Zichichi.

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# Activities for the GSSI

**October 2012-February 2018:** Entrusted of the role of coordinator of the physics area and coordinator of the PhD in astroparticle physics at the GSSI, on behalf of the director Eugenio Coccia; coordination of the new INFN group on behalf of INFN president Fernando Ferroni.

## Activities for the School

- Design of the scientific and educational project; invitation of professors
- Flowchart of the PhD program, refined over the years
- Doctorate Regulation
- Relations with the teaching staff and with the director
- Students selection 2013, 2014, 2015, 2016, 2017
- Management of dissertation for 2016 and 2017: thesis reception, choice of and contact with referees, organization of defenses
- Postdoc selection
- Relationships with the ANVUR for the PhD in astroparticle physics
- Reports to the scientific committee
- Presentations of the GSSI at the INFN, at Italian and foreign research centers, at schools, at political bodies, etc.
- Conference organization and in particular conference *Multiple Messengers and Challenges in Astroparticle Physics*, which led to the publication of a monograph with the same title for Springer
- 'Scientific Fair' Organization
- Numerous outreach activities: Asimov prize, relations with schools, teacher training courses, Lincei activities, etc

## Activities with Students

- Inbound and outbound orientation
- Entrance processes (listening/guiding) toward thesis projects
- Stimuli / suggestions towards the research themes of the doctorate; individual development; synergies
- Facilitating relationship of students with the scientific institutions of the territory
- Management of relations with professors, with the administration and with the outside
- Collection and processing of feedback on the lectures and on school received by students
- Contacts with advisors, from entry to exit
- Monitoring of the situations with exams, publications, and thesis projects
- Internal feedback implementation; relationships among students, virtuous scientific cycles, collaboration and competition, continuous exchanges of information, relationships with other doctorates
- Elaboration of reference principles to be followed



## Activities with Faculty

- Primary scientific investment in the experimental/observational aspects; insertion of the scientific lines of theoretical nuclear physics; delimitation of the lines of pure theoretical physics
- Extension of the scientific base of reference to SISSA, LNGS, L'Aquila U. and the whole INFN community interested in astroparticle physics
- Incentive to subscribe the scientific project of GSSI, especially with "external" professors, lecturers, postdocs, students
- Inclusion of professors, lecturers and postdocs in the life of the school
- Organization of teachers' board meetings
- Organization of lectures (including scientific and administrative contacts with professors and preparation / revision of timetable)
- Harmonization of courses and educational offer; feedback sent to the administration
- Continuous monitoring

## *INFN Assignments*

Coordinator of “Premio Asimov” for INFN on behalf of INFN’s “Commissione Coordinamento Terza Missione” since 2018.

INFN representative in the Science Advisory Committee of ASPERA till 2013.

Coordinator of Gran Sasso theory group since 2006-2012.

Coordinator of the research group CT51 at Gran Sasso till 2012.

Referee for the INFN National Permanent Committees II on non-accelerator physics and IV on theoretical physics.

Observer in Comm.II on behalf of Comm.IV.

Member of the committee for postdoc selection in 2006 and 2010.

Member of the committee for Fubini Prize for the best PhD thesis in theoretical physics on years 2005, 2006, 2007.

Partecipation in writing of INFN road map for Comm. II (rare processes).

Coordinator of the PhD and Research in Astroparticle Physics at the GSSI, L’Aquila 2012-2018

## *Other Assignments*

Associate Editor of European Physical Journal C since 2012.

Member of the Science Advisory Committee for European roadmap of Astroparticle physics.

Member of the ICRANet-INFN Scientific Committee since 2009.

Italian Physics Society (SIF) referent person at LNGS 2009-2013.

Coordinator for LNGS of the Virgo-EGO Science Forum (VESF) since April 2009.

Participation in preparing the ‘APS neutrino study report’ theoretical part, concluded on Dec 2004 (<http://www.aps.org/neutrino>).

Collaboration with prof. Alessandro Bettini, chairman of the international committee PaNAGIC, for the preparation of the LNGS webpage on astroparticle experiments and observatories.

Consultant and referee for Particle Data Group, for the updates of the neutrinos reviews on 2002.

Referee for: Advances in Space Research (ASRSD), Astroparticle Physics (APHYE), European Physical Journal C (EPJ), International Journal of Modern Physics A (IJMPA), Journal of High Energy Physics (JHEP), Journal of Physics G: Nuclear and Particle Physics (JPHGB), Nuclear Physics B (NPB), Nuovo Cimento B (NCB), Physica Scripta (PHSTB), Physics Letters B (PLB), Physics of the Dark Universe (PDARK), Physical Review D (PRD), Physical Review Letters (PRL), Ukrainian Journal of Physics (UJPH).

Referee for research projects submitted to the *Agence Nationale de la Recherche* (France) and *FONDECYT* and *CONICYT* (Chile).

## *Students*

I had the pleasure to follow some students in their thesis work:

- (1) G Nurzia (Aquila U.), in the experimental ICARUS group, years 2000-2001 (with prof. F Cavanna) PhD thesis on 3 flavor oscillations, defended with success on 2002.
- (2) ML Costantini (Aquila U.), theory group, years 2002-2005 (with prof. F Cavanna) master thesis on supernova neutrinos (2003, marks 110/110 cum laude) and PhD thesis on astrophysical neutrinos and defended with success on 2007.
- (3) V Caracciolo (Aquila U.), year 2005 (with prof. F Cavanna) master thesis on proton decay and experimental perspects, discussed with success on 2005 with marks 110/110 cum laude.
- (4) A Maiezza (Aquila U.), year 2008 (with prof. P. Monacelli), master thesis on lepton number violating phenomena in left-right models, discussed on 2008 (with marks 110/110 cum laude).
- (5) G Pagliaroli (Aquila U.), 2007-2008 (with prof. FL. Villante), PhD thesis on SN1987A and correlation between neutrinos and gravitational waves, discussed with success on 2009.
- (6) F. Rossi Torres, 2008-2009, PhD student at Campinas University, six months visit at Gran Sasso, funded by Brazilian grant, to collaborate on supernova neutrinos.
- (7) A Lami (Rome3 U.), year 2010-2011 (with prof. V. Lubicz), master thesis on electroweak reactions and their application in neutrino astrophysics, discussed on 2011 (with marks 100/110).
- (8) C. Lujan-Peschard, 2012-2013, PhD student at Guanajuato University, six months visit at Gran Sasso, funded by Mexican grant, to collaborate on neutrino physics and phenomenology.
- (9) V. Zema (Rome U.), year 2015-2016 (with prof. A. Capone), master thesis on Comparison between Direct and Indirect Detection of Dark Matter, discussed on 2016 (with marks 110/110).
- (10) A Palladino (GSSI), year 2014-2017, PhD thesis on high energy cosmic neutrinos, successfully defended on 2017.
- (11) A Gallo Rosso (GSSI), year 2015-2018, PhD thesis on supernova neutrinos.
- (12) C. Mascaretti (GSSI), year 2016-2019, PhD thesis on high-energy neutrinos.

## Outreach

Seminar on neutrinos at High school (Liceo Scientifico) "Galileo Galilei" of Macerata (1999). Conferences on the research at Gran Sasso Laboratory at "Crab Nebula" Club of Macerata (2001) and at the city library "Silvio Zavatti" of Civitanova Marche, MC (2002). Seminar on "Meteore comete e stelle" at Lago, CS (2010). Introduction to special relativity at High school (Liceo Scientifico) "Galileo Galilei" of Lanciano, CH (2008) and "Leonardo da Vinci" of Pescara (2011); same schools, seminar on "Sulla velocità dei neutrini e quella della luce" (2012). Seminars on "La natura della luce" (2014) and "Perche il sole brilla?" (2015), organized by High school "Galileo Galilei" of Pescara. Lecture on "Photoelectric effect and the crisis of the classical ideas on matter and radiation" at the High school "Leonardo da Vinci" of Pescara (2015). Public lecture "Vampiri, Fantasmi e Mutanti: le metafore per parlare dei neutrini", given at Festival of the Science, Genua 20, at a meeting with high school students of Nuoro (2017) and of Castrolibero (CS) (2018).

When I understood that Wikipedia is greatly used also by students in physics (circa 2006), I largely rewrote the web pages on neutrino oscillations, on MSW effect, leptogenesis, on Grand Unification and on Bruno Pontecorvo. Since then I occasionally contribute to Wiki on the pages regarding my fields of research.

I reply to interested peoples on pages of SISSA, Trieste (*Ulisse* web site), of Gran Sasso (*Ask the Lab* web site) and of Frascati laboratory (*Chiedi all'esperto* web site).

Popular articles: "La stabilita' della materia intorno a noi" published on the volume *Atlante di numeri e lettere-sistemi* (2006); "I neutrini della supernova SN1987A vent'anni piu' tardi", published as an essay of *Ulisse* web site (2007); "Neutrini di Alta Energia e Resti di Supernova", *Le Stelle* (2011). "Che cosa sappiamo sulla massa dei neutrini?", *Asimmetrie* (2013). Essay "Chi vuole che i neutrini vadano più veloci della luce?", *Deckard* web site (2014).

Since 2015, I use my LINKEDIN account for the purpose of scientific dissemination.

In 2015, I created Premio Asimov (Asimov Award), an initiative for scientific dissemination books edited in Italian language, that at its last (third) edition reached more than 2,000 Italian high school students. Since then, I keep it alive together with other few 100 colleagues and high school prof, who participate in its scientific committee.

Aug 21, 2018  
Francesco Vissani

