

# Curriculum Vitae of Carla Biggio

*last update: 05/05/2015*

## Personal Data

**Name** Carla Biggio

**Place and Date of Birth** Genova (Italy), 24/01/1976

**Nationality** Italian

**Present Address** Dipartimento di Fisica, Università di Genova, via Dodecaneso 33, 16146 Genova (IT)

**Telephone** +390103536275

**E-mail** biggio@ge.infn.it

**Languages** Italian (mother tongue), English, Spanish, French, Catalan, German

## Studies

**Oct95-Apr00** Undergraduate student at Università degli Studi di Genova, Italy.

**Apr99-Apr00** Member of Borexino Collaboration.

**19 April 2000** Discussion of the degree thesis entitled “*Sensibilità di Borexino ai Neutrini del  ${}^7\text{Be}$  e Soluzioni al Problema dei Neutrini Solari*” (“Sensitivity of Borexino to the  ${}^7\text{Be}$  Neutrinos and Solutions to the Solar Neutrino Problem”) under the supervision of Dr. M. Pallavicini and achievement of the university degree in physics (“Laurea in Fisica”) with grade 110/110 cum laude.

**Nov00-Oct03** Graduate student at Università degli Studi di Padova, Italy, under the supervision of Prof. F. Feruglio.

**2 December 2003** Discussion of Ph.D. thesis entitled “*Symmetry Breaking in Extra Dimensions*” and achievement of the Ph.D. degree in theoretical physics.

## Career

**Nov03-Sep05** Postdoc in the Theoretical Physics Group at the IFAE (Institut de Física d'Altes Energies), Universitat Autònoma de Barcelona, Spain.

**Sep05-Sep07** Postdoc in the Theoretical Physics Department of the Universidad Autónoma de Madrid, Spain.

**Oct07-Sep10** Postdoc at the Max Planck Institut for Physics (MPI), München, Germany.

**Oct10-Sept12** Postdoc at Institut de Física d'Altes Energies, Universitat Autònoma de Barcelona, Spain.

**Since Oct12** Researcher (Ricercatore a tempo determinato) at Dipartimento di Fisica, Università di Genova, Italy.

## Habilitations

- Obtention of the Italian “Abilitazione Scientifica Nazionale” on 21/01/2015.

## Grants

- Obtention in 2013 of the Marie Curie Career Integration Grant. It is a personal grant which lasts four years and have been financed for a total amount of 100000 euros, which will be mainly employed to create a postdoctoral grant.
- P.I. of the “PRA 2013”, a grant of the University of Genova, financed with 6000 euros.

## Schools, Conferences and Workshops Attended

1. *SNFT2000 - IX Seminario Nazionale di Fisica Teorica*, Parma, Italy, 4-15/09/2000;
2. *Summer School in Particle Physics*, ICTP, Trieste, Italy, 18/06 - 6/07/2001;
3. Lectures on *Physics of Extra Dimensions*, Padova, Italy, 26-28/06/2001;
4. *First Graduate School in Physics at Colliders*, Torino, Italy, 2-6/10/2001;
5. Lectures on *Supergravity*, Roma, Italy, 12-16/11/2001;
6. *XXXVII Rencontres de Moriond on Electroweak Interactions and Unified Theories*, Les Arcs, France, 9-16/03/2002, oral and written contribution;
7. Fifth European Meeting *Planck 02 - Supersymmetry and Brane Worlds*, Kazimierz, Poland, 25-29/05/2002, oral contribution;

8. Mid-term Meeting *RTN Across the Energy Frontier*, Palaiseau, France, 10-14/12/2002, oral contribution;
9. X International Workshop on *Neutrino Telescopes*, Venezia, Italy, 11-14/03/2003;
10. Sixth European Meeting *Planck 03 - From the Planck Scale to the Electroweak Scale*, Madrid, Spain, 26-31/05/2003, oral contribution;
11. *Hierarchy Problems in Four and More Dimensions*, Trieste, Italy, 1-4/10/2003;
12. Seventh European Meeting *Planck 04 - From the Planck Scale to the Electroweak Scale*, Bad Honnef, Germany, 24-28/05/2004;
13. *Strings at CERN*, CERN, Switzerland, 5-7/07/2004;
14. *X IFT-UAM/CSIC Christmas Workshop*, Madrid, Spain, 15-17/12/2004, oral contribution;
15. *XL Rencontres de Moriond on Electroweak Interactions and Unified Theories*, La Thuile, Italy, 5-12/03/2005, oral and written contribution;
16. *Cosmic Connections @ La Magia*, Quarrata, Italy, 17-23/04/2005;
17. *What's  $\nu$  ? - IFT MiniWorkshop on Neutrino Physics*, Madrid, Spain, 18-20/05/2005;
18. *Eurogdr on Supersymmetry 2005*, Barcelona, Spain, 2-5/11/2005, oral contribution;
19. Network Meeting *The Quest for Unification*, Madrid, Spain, 12-13/12/2005;
20. *XI IFT-UAM/CSIC Christmas Workshop*, Madrid, Spain, 14-16/12/2005;
21. *Cosmology and Underground Laboratory Physics*, Valencia, Spain, 6/03/2006;
22. Ninth European Meeting *Planck 06 - From the Planck Scale to the Electroweak Scale*, Paris, France, 29/05 - 02/06/2006, oral contribution;
23. *NUFACT06*, Irvine, California, 24-30/08/2006, oral contribution;
24. *Flavour in the era of LHC*, CERN, Switzerland, 09-11/10/2006, oral contribution;
25. *Getting ready for the LHC*, Madrid, Spain, 23-27/10/2006;
26. *XII IFT-UAM/CSIC Christmas Workshop*, Madrid, Spain, 18-20/12/2006;
27. *XLII Rencontres de Moriond on Electroweak Interactions and Unified Theories*, La Thuile, Italy, 10-17/03/2007;
28. *European Physical Society Conference HEP 2007*, Manchester, England, 19-25/07/2007, oral and written contribution;
29. *PAU Academic Training 07*, Madrid, Spain, 10-14/12/2007;

30. *Incontri di Fisica delle Alte Energie - IFAE2008*, Bologna, Italy, 26-28/03/2008, oral and written contribution;
31. *Planck 08 - From the Planck Scale to the Electroweak Scale*, Barcelona, Spain, 19-23/05/2008, oral contribution;
32. *Sestri Levante 2008 - Convegno Informale di Fisica Teorica*, Sestri Levante, Italy, 04-06/06/2008, oral contribution;
33. *Rencontres de Physique de Particules 2009*, Palaiseau, France, 23-25/03/2009, oral contribution;
34. *Planck 09 - From the Planck Scale to the Electroweak Scale*, Padova, Italy, 25-29/05/2009, oral contribution;
35. *Beyond the Standard Model Physics at the Threshold*, Aspen (CO), USA, 5-19/07/2009;
36. *Rencontres de Physique de Particules 2010*, Lione, France, 25-27/01/2010, oral contribution;
37. *Indirect Searches for New Physics at the time of LHC*, Galileo Galilei Institute, Firenze, Italy, 7-26/03/2010;
38. *Planck 10 - From the Planck Scale to the Electroweak Scale*, CERN, Switzerland, 31/05-04/06/2010;
39. *Planck 11 - From the Planck Scale to the Electroweak Scale*, Lisbon, Portugal, 30/05-03/06/2011, oral contribution;
40. *III CPAN Days*, Barcelona, Spain, 2-4/11/2011, oral contribution;
41. *Rencontres de Moriond on Electroweak Interactions and Unified Theories*, La Thuile, Italy, 03-10/03/2012, oral and written contribution;
42. *VI Workshop Italiano sulla Fisica p-p a LHC*, Genova, Italy, 8-10/05/2013;
43. *WIN 2013*, Natal, Brasil, 16-20/09/2013, oral contribution;
44. *Rencontres de Moriond on Electroweak Interactions and Unified Theories*, La Thuile, Italy, 15-22/03/2014, oral and written contribution;
45. *Portoroz 2015 - Particle Phenomenology From the Early Universe to High Energy Colliders*, Portoroz, Slovenia, 7-10/04/2015.

## Seminars and Conference Talks

### Seminars

1. *Fermion Generations, Masses and Mixing Angles from extra Dimensions*, Departamento de Física Teórica y del Cosmos, Universidad de Granada, Spain, 04/06/2003;
2. *Symmetry Breaking in Extra Dimensions*, Ph.D thesis dissertation, Dipartimento di Fisica, Università di Padova, Italy, 02/12/2003;
3. *Fermion Generations from Extra Dimensions*, IFAE, Universitat Autònoma de Barcelona, Spain, 09/01/2004;
4. *Flavour Physics from Extra Dimensions*, Dipartimento di Fisica, Università di Genova, Italy, 29/06/2004;
5. *Tadpoles and Symmetries in Higgs-Gauge Unification Theories*, Dipartimento di Fisica, Università di Padova, Italy, 21/10/2004;
6. *Unitarity of the Leptonic Mixing Matrix*, Dipartimento di Fisica, Università di Genova, Italy, 06/06/2006;
7. *Neutrino Masses and Unitarity of the Leptonic Mixing Matrix*, Dipartimento di Fisica, Università di Padova, Italy, 20/11/2006;
8. *Neutrino Masses and Unitarity of the Leptonic Mixing Matrix*, Sissa, Trieste, Italy, 24/11/2006;
9. *Neutrino Masses and Unitarity of the Leptonic Mixing Matrix*, Instituto Superior Técnico, Lisbon, Portugal, 13/12/2006;
10. *Neutrino Masses and Unitarity of the Leptonic Mixing Matrix*, Instituto de Física Teórica, Universidad Autónoma de Madrid, Spain, 16/01/2007;
11. *Neutrino Masses and Unitarity of the Leptonic Mixing Matrix*, Laboratoire de Physique Theorique d'Orsay, Univ. Paris-Sud 11, France, 01/02/2007;
12. *Low Energy Effects of Neutrino Masses*, Departamento de Física Teórica y del Cosmos, Universidad de Granada, Spain, 12/06/2007;
13. *Can we distinguish among different models for neutrino mass in the near future?*, IFAE, Universitat Autònoma de Barcelona, Spain, 29/02/2008;
14. *Can we distinguish among different models for neutrino mass in the near future?*, DESY, Hamburg, Germany, 05/05/2008;
15. *Phenomenology of (low scale) seesaw models*, TUM, Muenchen, Germany, 18/07/2008;
16. *Phenomenology of (low scale) seesaw models*, Università di Genova, Italy, 20/10/2008;
17. *Neutrino masses and new physics*, Dipartimento di Fisica, Università di Padova, Italy, 15/01/2009;

18. *Neutrino masses and new physics*, LPTA, Montpellier, France, 10/03/2009;
19. *Neutrino masses and new physics*, CPT, Marseille, France, 16/03/2009;
20. *Neutrino masses and new physics*, IPNL, Lyon, France, 20/03/2009;
21. *Neutrino NSI & non-unitarity: which constraints?*, LPT, Orsay, France, 26/03/2009;
22. *Neutrino non-standard interactions: a critical appraisal*, IFAE, Universitat Autònoma de Barcelona, Spain, 18/09/2009;
23. *Lepton flavour violation in (SUSY) seesaw models*, Max-Planck-Institut fuer Physik, Munich, Germany, 10/06/2010;
24. *Lepton flavour violation in (SUSY) seesaw models*, Dipartimento di Fisica, Università di Genova, Italy, 08/07/2010;
25. *Phenomenology of SUSY with intermediate scale physics*, Max-Planck-Institut fuer Physik, Munich, Germany, 20/12/2011;
26. *Testing the seesaw mechanism at the LHC* IFAE, Universitat Autònoma de Barcelona, Spain, 22/02/2012;
27. *Is the 125 GeV scalar the neutrino superpartner?*, Université Libre de Bruxelles, Bruxelles, Belgium, 06/06/2013;
28. *Is the 125 GeV scalar the neutrino superpartner?*, Università di Padova, Italy, 4/12/2013;
29. *Is the 125 GeV scalar the neutrino superpartner?*, Weizmann Institute, Israel, 11/06/2014.

## Conference Talks

1. *Gauge Symmetry Breaking on Orbifolds*, “XXXVII Rencontres de Moriond” , Les Arcs, France, 15/03/2002;
2. *Symmetry Breaking for Bosonic Systems on Orbifolds*, Fifth European Meeting “Planck 02” , Kazimierz, Poland, 28/05/2002;
3. *Scherk-Schwarz Mechanism and Mass Terms on Orbifolds*, Mid-term Meeting “RTN Across the Energy Frontier” , Palaiseau, France, 12/12/2002;
4. *Fermion Generations, Masses and Mixing Angles from Extra Dimensions*, Sixth European Meeting “Planck 03” , Madrid, Spain, 30/05/2003;
5. *Tadpoles and Symmetries in Higgs-Gauge Unification Theories*, “X IFT-UAM/CSIC Christmas Workshop” , Madrid, Spain, 16/12/2004;
6. *Divergencies and Symmetries in Higgs-Gauge Unification Theories*, “XL Rencontres de Moriond” , La Thuile, Italy, 07/03/2005;
7. *Higgs-Gauge Unification Theories: Divergences and Symmetries*, “Eurogdr on SUSY” , Barcelona, Spain, 03/11/2005;

8. *Unitarity of the Leptonic Mixing Matrix*, Ninth European Meeting “Planck 06”, Paris, France, 01/06/2006;
9. *Unitarity of the Leptonic Mixing Matrix*, “NUFACT06”, Irvine, California, 29/08/2006;
10. *Unitarity of the Leptonic Mixing Matrix*, “Flavour in the era of LHC”, CERN, Switzerland, 10/10/2006;
11. *Neutrino Masses and New Physics at TeV Scale*, “HEP 2007”, Manchester, England, 20/07/2007;
12. *Can we disentangle among different models for neutrino mass in the near future?*, “MPI Project Review 2007”, München, Germany, 18/12/2007;
13. *Effetti di bassa energia in modelli di massa del neutrino*, “IFAE2008”, Bologna, Italy, 26/03/2008;
14. *Discriminating among different seesaw models*, “Planck 08”, Barcelona, Spain, 21/05/2008;
15. *Can we distinguish among different models for neutrino mass in the near future?*, “Sestri Levante 2008”, Sestri Levante, Italy, 04/06/2008;
16. *Loop bounds on neutrino non-standard interactions*, “RPP 2009”, Palaiseau, France, 24/03/2009;
17. *Neutrino mass hierarchies in the double seesaw model*, “Planck 09”, Padova, Italy, 28/05/2009;
18. *Neutrino mass hierarchies in the double seesaw model*, “RPP 2010”, Lyon, France, 25-27/01/2010;
19. *Phenomenology of SUSY  $SU(5)$  with type I+III seesaw*, “Planck 2011”, Lisbon, Portugal, 30/05-03/06/2011;
20. *TeV neutrino implications at the LHC*, “III CPAN Days”, Barcelona, Spain, 02-04/11/2011;
21. *Phenomenology of SUSY with intermediate scale physics*, “Rencontres de Moriond on Electroweak Interactions and Unified Theories”, La Thuile, Italy, 03-10/03/2012;
22. *Is the 125 GeV scalar the neutrino superpartner?*, “WIN 2013”, Natal, Brasil, 16-20/09/2013;
23. *Is the 125 GeV scalar the neutrino superpartner?*, “Rencontres de Moriond on Electroweak Interactions and Unified Theories”, La Thuile, Italy, 15-22/03/2014.

## List of Publications

1. C. Biggio, *Gauge Symmetry Breaking on Orbifolds*, published in the Proceedings of “37th Rencontres de Moriond on Electroweak Interactions and Unified Theories” [hep-ph/0205142];
2. C. Biggio and F. Feruglio, *Symmetry Breaking for Bosonic Systems on Orbifolds*, **Ann. Phys.** **301: 65-81, 2002** [hep-th/0207014];

3. C. Biggio, F. Feruglio, A. Wulzer and F. Zwirner, *Equivalent Effective Lagrangians for Scherk-Schwarz Compactifications*, **JHEP** **0211: 013**, **2002** [hep-th/0209046];
4. C. Biggio, F. Feruglio, I. Masina and M. Pérez-Victoria, *Fermion Generations, Masses and Mixing Angles from Extra Dimensions*, **Nucl. Phys. B** **677: 451-470**, **2004** [hep-ph/0305129];
5. C. Biggio, *Symmetry Breaking in Extra Dimensions*, Ph.D thesis [hep-ph/0312209];
6. C. Biggio and M. Quirós, *Higgs-Gauge Unification without Tadpoles*, **Nucl. Phys. B** **703: 199-216**, **2004** [hep-ph/0407348];
7. C. Biggio and M. Quirós, *Tadpoles and Symmetries in Higgs-Gauge Unification Theories*, published in the proceedings of “Pascos04” [hep-ph/0410226];
8. C. Biggio, *Divergences and Symmetries in Higgs-Gauge Unification Theories*, published in the proceedings of “40th Rencontres de Moriond on Electroweak Interactions and Unified Theories”, [hep-ph/0505116];
9. C. Biggio, E. Massó and J. Redondo, *Mixing of Photons with Massive Spin-Two Particle in a Magnetic Field*, **Phys. Rev. D** **79: 015012**, **2009** [hep-ph/0604062];
10. S. Antusch, C. Biggio, E. Fernández-Martínez, B. Gavela and J. Lopez-Pavón, *Unitarity of the Leptonic Mixing Matrix*, **JHEP** **0610: 084**, **2006** [hep-ph/0607020];
11. S. Antusch, C. Biggio, E. Fernández-Martínez, B. Gavela and J. Lopez-Pavón, *Determining the PMNS Matrix Elements without Assuming Unitarity*, **AIP Conf.Proc.903: 279-282**, **2007**;
12. A. Abada, C. Biggio, F. Bonnet, B. Gavela and T. Hambye, *Low-energy effects of neutrino masses*, **JHEP** **0712: 061**, **2007** [0707.4058[hep-ph]];
13. C. Biggio, *Neutrino masses and new physics at TeV scale*, **J. Phys.: Conf. Ser.** **110 072002**, **2008**;
14. The ISS Physics Working Group, *Physics at a Future Neutrino Factories and Super-beam Facility*, **Rept. Prog. Phys.** **72: 106201**, **2009** [arXiv: 0710.4947[hep-ph]];
15. M. Raidal et al., *Flavour physics of leptons and dipole moments*, **Eur. Phys. J. C****57: 13-182**, **2008** [arXiv:0801.1826[hep-ph]];
16. A. Abada, C. Biggio, F. Bonnet, B. Gavela and T. Hambye,  *$\mu \rightarrow e\gamma$  and  $\tau \rightarrow l\gamma$  decays in the fermion triplet seesaw model*, **Phys. Rev. D** **78: 033007**, **2008** [arXiv:0803.0481 [hep-ph]];
17. C. Biggio, *The Contribution of fermionic seesaws to the anomalous magnetic moment of leptons*, **Phys. Lett. B** **668: 378-384**, **2008** [arXiv:0806.2558 [hep-ph]];
18. C. Biggio, *Low energy processes to distinguish among seesaw models*, **Nuovo Cim.** **123 B: 880-882**, **2008** [arXiv:0809.3922 [hep-ph]];

19. C. Biggio, M. Blennow, E. Fernández-Martínez, *Loop bounds on non-standard neutrino interactions*, **JHEP 0903: 139, 2009** [arXiv:0902.0607 [hep-ph]];
20. C. Biggio, M. Blennow, E. Fernández-Martínez, *General bounds on non-standard neutrino interactions*, **JHEP 0908: 090, 2009** [arXiv:0907.0097 [hep-ph]];
21. C. Biggio, L. Calibbi, *Phenomenology of SUSY SU(5) with type I+III seesaw*, **JHEP 1010: 037, 2010** [arXiv:1007.3750 [hep-ph]];
22. C. Biggio, F. Bonnet, *Implementation of the type III seesaw model in FeynRules/MadGraph and prospects for discovery with early LHC data*, **Eur. Phys. J. C72 (2012) 1899** [arXiv:1107.3463[hep-ph]];
23. C. Biggio, L. Calibbi, A. Masiero, S. Vempati *Postcards from oases in the desert: phenomenology of SUSY with intermediate scales*, **JHEP 1208 (2012) 150** [arXiv:1205.6817 [hep-ph]];
24. C. Biggio, *Phenomenology of SUSY with intermediate scale physics*, published in the Proceedings of “Rencontres de Moriond on Electroweak Interactions and Unified Theories”, arXiv:1206.0134 [hep-ph];
25. The CMS collaboration, *Search for heavy lepton partners of neutrinos in proton-proton collisions in the context of the type III seesaw mechanism*, **Phys. Lett. B718 (2012) 348-368** [arXiv:1210.1797 [hep-ex]];
26. F. Riva, C. Biggio, A. Pomarol, *Is the 125 GeV Higgs the superpartner of a neutrino?*, **JHEP 1302 (2013) 081**, [arXiv:1211.4526 [hep-ph]];
27. C. Biggio, *Is the standard model scalar the first discovered SUSY particle?*, published in the Proceedings of “Rencontres de Moriond on Electroweak Interactions and Unified Theories”, arXiv:1407.0561 [hep-ph];
28. C. Biggio and M. Bordone, *Minimal muon anomalous magnetic moment*, **JHEP 1502 (2015) 099**, [arXiv:1411.6799 [hep-ph]].

## Teaching Activities

- Teaching Assistant at the Spanish Summer School for Ph.D. students “Taller de Altas Energías”, Santander, Spain, 02-07/07/2006 for the courses of quantum field theory and of flavour physics.
- Discussion leader at the “European School of High Energy Physics” (CERN School), Cheile Gradistei, Romania, 7-20/09/2011.
- Teaching Assistant at Genova University for the academic year 2012-13 in the courses of
  - FISICA 2: mechanics and fluids (for physicists; 24 hours);
  - FISICA 3: electromagnetisms and relativity (for physicists; 24 hours);

- FISICA GENERALE: electromagnetism (for engineers; 16 hours).
- Teaching Assistant at Genova University for the academic year 2013-14 in the courses of
  - FISICA 2: mechanics and fluids (for physicists; 25 hours);
  - FISICA 3: electromagnetisms and relativity (for physicists; 25 hours);
  - FISICA GENERALE: electromagnetism (for engineers; 15 hours).
- Teaching Assistant at Genova University for the academic year 2014-15 in the courses of
  - FISICA 2: mechanics and fluids (for physicists; 25 hours);
  - FISICA 3: electromagnetisms and relativity (for physicists; 25 hours);
  - FISICA GENERALE: electromagnetism (for engineers; 20 hours).

## Theses

- Advisor for the master thesis of M. Bordone entitled “Contributi di nuova fisica al momento magnetico anomalo del muone”;
- Co-advisor for the master thesis of C. Varni entitled “Search for the Standard Model Higgs boson produced by vector boson fusion and decaying to beauty quarks with the ATLAS detector”.

## Conferences and seminars organization

- Co-organizer of astroparticle seminars at Max Planck Institute fuer Physics during the academic year 2009-2010;
- Organizer of seminars at IFAE during the academic year 2011-2012;
- Organizer of phenomenology seminars at the Dipartimento di Fisica dell’Università di Genova since 2013;
- Co-organizers of the conference “Physics on the Riviera 2015: an isthmus between condense matter and high energy theoretical physics”, Sestri Levante, 16-18/09/2015.

## Participation in Collaborations and Working Groups

1. International Scoping Study of a future Neutrino Factory and super-beam facility (arXiv: 0710.4947[hep-ph]);
2. Flavour in the era of LHC (arXiv:0801.1826[hep-ph]);
3. Member of the PAU (Physics of the Accelerating Universe) Collaboration (<http://www.ice.csic.es/research/PAU/PAU-welcome.html>).

## Journals Referee

Referee for JHEP, PRD, PLB and EPJC.