

# Arianna Carbone

## Curriculum Vitae

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16<sup>th</sup> November 1984, Rome, Italy



### Education

04/2014-  
03/2011 **PhD thesis in Physics**

Title: *Self-consistent Green's functions with three-body forces*

Supervisors: Prof. Artur Polls and Dr. Arnau Rios

Defense Date: 11 April 2014

Institution: Universitat de Barcelona, Spain

06/2010-  
10/2009 **Master thesis in Physics**

Title: *Latent heat of nuclear matter*

Supervisor: Prof. Artur Polls

Defense Date: 30 June 2010

Institution: Universitat de Barcelona, Spain

02/2009-  
11/2006 **Master thesis *Tesi di Laurea* in Physics**

Title: *Transport properties of  $\beta$ -stable nuclear matter*

Supervisor: Prof. Omar Benhar

Defense Date: 26 February 2009

Institution: "Sapienza" Università di Roma, Italy

11/2006-  
10/2003 **Bachelor thesis in Physics**

Title: *Simple models of electron-electron interaction*

Supervisor: Prof. Giovanni Battista Bachelet

Defense Date: 23 November 2006

Institution: "Sapienza" Università di Roma, Italy

### Research experience

present-  
10/2017 Postdoctoral Researcher: ECT\* Trento, Italy

present-  
07/2017 Visiting Research Fellow: University of Surrey, UK

07/2017-  
05/2015 Humboldt Fellow for Postdoctoral Research: TU Darmstadt, Germany

05/2016-  
06/2015 Visiting Research Assistant: University of Surrey, UK

04/2015- Postdoctoral Researcher: TU Darmstadt, Germany  
05/2014  
04/2014- PhD Candidate: Universitat de Barcelona, Spain  
03/2011  
06/2010- Master Student: Universitat de Barcelona, Spain  
10/2009  
02/2009- Master Student: "Sapienza" Università di Roma, Italy  
10/2006

## Research stays

07/2013- University of Surrey, UK  
06/2013  
Project: Numerical developments of three-body forces and applications to nuclear systems  
05/2012- University of Surrey, UK  
03/2012  
Project: Formal developments of three-body forces in nuclear systems

## Teaching & Supervision

2016 Assistant Supervisor of Bachelor candidate Lars Zürek at TU Darmstadt.  
2017-2015 Assistant Supervisor of PhD candidate Christian Drischler at TU Darmstadt.  
2014/2013 Teaching Assistant Laboratory of Thermodynamics, Universitat de Barcelona, Spain  
2013/2012 Teaching Assistant Introductory Physics, Universitat de Barcelona, Spain  
Teaching Assistant Laboratory of Thermodynamics, Universitat de Barcelona, Spain

## Fellowships & Merits

**Lindau Nobel Laureate Meeting:** Young Scientist selected to participate at the 2016 Lindau Nobel Laureate Meeting for Physics.  
**Research Fellowship:** Humboldt Fellowship for Postdoctoral Researchers, Alexander von Humboldt Foundation. 1 May 2015 – 30 April 2017, TU Darmstadt.  
**PhD fellowship:** Government of Catalunya, Spain (FI-DGR 2011). 1 March 2011 – 28 February 2014, Universitat de Barcelona.  
**Research stay fellowship:** Government of Catalunya, Spain (BE-DGR 2011), to attend a research stay at the University of Surrey (UK). March/May 2012.  
**Collaboration fellowship:** ICC, Institute of Sciences of the Cosmos, Universitat de Barcelona. 5 October 2010 – 28 February 2011.  
**Master fellowship:** "Sapienza" Università di Roma, to attend a 1 year Master at the Universitat de Barcelona. 1 September 2009 – 31 August 2010.  
**Erasmus fellowship:** "Sapienza" Università di Roma, to attend 1 academic year at the Universitat de Valencia. 1 October 2006 – 30 September 2007.

## Prizes

**Prize Adelchi Fabrocini 2011**, for the Master's degree thesis *Tesi di Laurea: Transport properties of  $\beta$ -stable nuclear matter*.  
**Diploma GENF-ATI Prize 2016** (Nuclear Physics Specialized Group of the Spanish Royal Society of Physics), for the PhD thesis: *Self-consistent Green's functions with three-body forces*.

## Organization of activities

- 2017 Bridging nuclear and gravitational physics: the dense matter equation of state. ECT\* Workshop. 5-9 June (ECT\*, Italy). Coordinator.

## Referee

Phys. Rev. C; Eur. Phys. J. A.; Symmetry; Int. J. Mod. Phys. E.; J. Phys.: Conf. Ser.

## Publications

### Articles

- [1] A. Carbone, A. Polls, and A. Rios. Microscopic predictions of the nuclear matter liquid-gas phase transition. *Phys. Rev. C*, **98**:025804, 2018.
- [2] A. Rios, A. Carbone, and A. Polls. Comparison of nuclear hamiltonians using spectral function sum rules. *Phys. Rev. C*, **96**:014003, 2017.
- [3] P. Klos, A. Carbone, K. Hebeler, J. Menéndez, and A. Schwenk. Uncertainties in constraining low-energy constants from  ${}^3\text{H}$   $\beta$  decay. *Eur. Phys. J. A*, **53**:168, 2017. [Erratum: *Eur. Phys. J. A* **54**:76, 2018].
- [4] C. Barbieri and A. Carbone. Self-consistent Green's function approaches. arXiv:1611.03923 [nucl-th] Chapter 11 in Lect. Notes Phys. 936, *An advanced course in computational nuclear physics: Bridging the scales from quarks to neutron stars*, M. Hjorth-Jensen, M. P. Lombardo, U. Van Kolck, Editors, 2017.
- [5] C. Drischler, A. Carbone, K. Hebeler, and A. Schwenk. Neutron matter from chiral two- and three-nucleon calculations up to  $\text{N}^3\text{LO}$ . *Phys. Rev. C*, **94**:054307, 2016.
- [6] D. Ding, A. Rios, H. Dussan, W. H. Dickhoff, S. J. Witte, A. Carbone, and A. Polls. Pairing in high-density neutron matter including short- and long-range correlations. *Phys. Rev. C*, **94**:025802, 2016.
- [7] A. Carbone, A. Rios, and A. Polls. Correlated density-dependent chiral forces for infinite-matter calculations within the Green's function approach. *Phys. Rev. C*, **90**:054322, 2014.
- [8] A. Carbone, A. Polls, C. Providência, A. Rios, and I. Vidaña. Tensor force effects and high-momentum components in the nuclear symmetry energy. *Eur. Phys. J. A*, **50**:1, 2014.
- [9] Arianna Carbone, Andrea Cipollone, Carlo Barbieri, Arnau Rios, and Artur Polls. Self-consistent Green's functions formalism with three-body interactions. *Phys. Rev. C*, 88:054326, Nov 2013.
- [10] A. Carbone, A. Polls, and A. Rios. Symmetric nuclear matter with chiral three-nucleon forces in the self-consistent Green's functions approach. *Phys. Rev. C*, 88:044302, Oct 2013.
- [11] A. Carbone, A. Polls, and A. Rios. High-momentum components in the nuclear symmetry energy. *EPL*, **97**:22001, 2012.
- [12] Arianna Carbone, Artur Polls, Arnau Rios, and Isaac Vidaña. Latent heat of nuclear matter. *Phys. Rev. C*, 83:024308, Feb 2011.
- [13] O. Benhar and A. Carbone. Shear viscosity of  $\beta$ -stable nuclear matter. arXiv:0912.0129v1 [nucl-th], 2009.

## Proceedings

- [1] A. Carbone, A. Polls, and A. Rios. High-momentum components in the nuclear symmetry energy. *AIP Conf. Proc.*, 1541:140, 2013.
- [2] A. Rios, A. Carbone, A. Polls, and I. Vidaña. Liquid-gas phase transition in nuclear matter: Mean-field and beyond. *EPJ Web of Conference*, 31:00003, 2012.
- [3] A. Carbone and O. Benhar. Transport properties of  $\beta$ -stable nuclear matter. *J. Phys.: Conf. Ser.*, 336:012015, 2011.
- [4] A. Rios, A. Carbone, A. Polls, and I. Vidaña. Liquid-gas phase transition in nuclear matter in the mean-field approximation. *J. Phys.: Conf. Ser.*, 321:012058, 2011.

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## Presentations at Conferences, Workshops & Meetings

- 2019 – Recent Progress in Many-Body Theories MBT-20, 9-13 September (Toulouse, France). Invited Talk.
- PHAROS Conference 2019: the multi-messenger physics and astrophysics of neutron stars, 22-26 April (Platja d'Aro, Spain). Invited Talk.
  - Joint LIA COLL-AGAIN, COPIGAL, and POLITA Workshop, 5-7 March (Warsaw, Poland). Invited Talk.
- 2018 – NuSYM2018, 8th International Symposium on Nuclear Symmetry Energy, 10-13 September (Busan, South Korea). Invited Talk.
- ECT\* Workshop: Probing exotic structure of short-lived nuclei by electron scattering, 16-20 July (ECT\*, Italy). Invited Talk.
  - ENSAR2 Town Meeting, 17-19 April (Groningen, Netherlands). Contributed talk.
- 2017 – International Conference on Advances in Radioactive Isotope Science, ARIS 2017, 28 May-2 June (Keystone, USA). Plenary Talk
- ECT\* Workshop: Walk on the neutron-rich side, 10-14 April (ECT\*, Italy). Invited Talk.
- 2016 – CERN TH institute "From quarks to gravitational waves: Neutron stars as a laboratory for fundamental physics", 5-9 December (CERN, Switzerland). Invited Talk
- EMMI Physics Day 2016, 15 November (GSI, Germany). Plenary Talk.
  - Nuclear Physics, Compact Stars, and Compact Star Mergers (NPCSM 2016), 24-29 October (Yukawa Institute for Theoretical Physics, Japan). Contributed Talk.
  - Nuclear Structure 2016, 24-29 July 2016 (Knoxville, USA). Contributed Talk.
  - Deutsche Physikalische Gesellschaft - Spring Meeting, 14-18 March (Darmstadt, Germany). Contributed Talk.
- 2015 – EMMI Workshop. Cold dense nuclear matter: from short-range nuclear correlations to neutron stars, 13-16 October (GSI, Germany). Invited Talk.
- Recent Progress in Many-Body Theories MBT-18, 16-21 August (Niagara Falls, USA). Invited Talk.
  - The Neutron Star Radius, and all that Jazz, 30 June-2 July (Montreal, Canada). Invited Talk.
  - Deutsche Physikalische Gesellschaft - Spring Meeting, 23-27 March (Heidelberg, Germany). Plenary Talk.
  - ECT\* Workshop: Observations & theory in the dynamics of neutron stars, 26-30 January. (ECT\*, Italy). Contributed Talk.
- 2014 – ECT\* Workshop: Three-Body Forces: From Matter to Nuclei, 5-9 May. (ECT\*, Italy). Invited Talk.

- 2013 – Neutron Stars: Nuclear Physics, Gravitational Waves and Astronomy, 29-30 July. (Guildford, UK). Contributed Talk.
  - INT Program 13-1a: Computational and Theoretical Advances for Exotic Isotopes in the Medium Mass Region, 25 March-8 April. (INT, USA). Contributed Talk.
- 2012 – Mini-workshop: Recent Developments in Green's Function Methods, 6 September. (Ghent, Belgium). Invited Talk.
  - IOP Nuclear Physics Conference, 2-4 April. (Brighton, England). Contributed Talk.
- 2011 – XXXIII Reunión Biental de la Real Sociedad Española de Física, 19-23 September. (Santander, Spain). Contributed Talk.
  - XIII Convegno su Problemi di Fisica Nucleare Teorica, 6-8 April. (Cortona, Italy). Invited Talk.
- 2010 – Compstar2010, Workshop on Computational Tools for Compact Star Astrophysics, 14-16 February. (GANIL, France). Contributed Talk.

## Attendance to Meetings & Schools

- 2016 – Compact Stars and Gravitational Waves, within the NPCSM 2016, 31 October-4 November (Yukawa Institute for Theoretical Physics, Japan).
  - Neutrinos in Nuclear Physics, 29-31 July 2016 (Knoxville, USA).
- 2013 – First UK LOFT Meeting, , 24-25 June. (London, UK).
- 2012 – HYP2012, International Conference on Hypernuclear and Strange Particle Physics, 1-5 October. (Barcelona, Spain).
  - EFN2012, VII Encuentros de Física Nuclear, 14-16 September. (La Rábida, Spain).
  - School: International Scientific Meeting on Nuclear Physics, 9-13 September. (La Rábida, Spain).
- 2011 – Three-Nucleon Forces in the Vacuum and in the Medium, 10-15 July. (ECT\*, Italy).
  - School: Scuola di Fisica Nucleare "Raimondo Anni", 29 May-4 June. (Otranto, Italy).
  - Compstar 2011: School on Gravitational Waves and Electromagnetic Radiation from Compact Stars, 3-7 May. (Catania, Italy).
- 2010 – Aurora School 2010, 20 September-1 October. (ECT\*, Italy).
  - Compstar 2010: School on Computational Tools for Compact Star Astrophysics, 8 -13 February. (GANIL, France).
- 2003 – INFN: Laboratori di Frascati. Seminars, Courses and Group Work for high-school students, July. (Frascati, Italy).

## Other talks

- 2018 – TU Darmstadt. Seminar, 4 December.
  - Ganil. Seminar, 30 November.
  - University of Barcelona. Seminar, 6 November.
  - University of York. Seminar, 15 February.
  - University of Manchester. Seminar, 14 February.
- 2017 – ECT\*. Seminar, 6 December.
  - Forschungszentrum Jülich. Seminar, 18 July.
  - IPN Orsay. Seminar, 30 March.
- 2016 – IPN Orsay. Seminar, 25 May.
- 2015 – TU München. Seminar, 22 October.
- 2014 – TU Darmstadt. Seminar, 3 July.

- 2013 – TU Darmstadt. Seminar, 19 September.  
– XIII Jornades del Departament Científiques ECM. Talk, 28 May.
- 2012 – University of Barcelona. Seminar, 8 November.  
– School: International Scientific Meeting on Nuclear Physics. La Rábida (Spain). Talk, 13 September.
- 2011 – School: Scuola di Física Nucleare "Raimondo Anni". Otranto (Italy). Talk, 30 June.

## Languages

**Italian**

*Mother Language*

**English**

*Mother Language*

**Spanish**

*Advanced Level*

**French**

*Medium Level*

**Catalan**

*Medium Level*

**German**

*Medium Level*