



Matteo Gallone
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Address
Via Bonomea 265
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Last update: January
9, 2018

Matteo Gallone

PhD candidate

About Me Currently I am a PhD candidate in Geometry and Mathematical Physics at SISSA in Trieste (Italy). I am also affiliated with the INdAM-GNFM, the national group of Mathematical Physics.

My scientific interests are in the area of Mathematical Physics and in particular my current research topic concerns certain property of Dirac operators. Beside this I am also interested in other problems in *operator theory*, *classical mechanics* and *statistical physics*. In particular:

- Self-adjointness problem for quantum Hamiltonians (Dirac operator, Schrödinger with zero-range interaction);
- Hamiltonian perturbation theory (Normal forms, Fermi-Pasta-Ulam problem).

Education

2015 - Today, SISSA (Trieste)

PhD candidate in Geometry and Mathematical Physics.

Advisor: Alessandro Michelangeli

2013 - 2015, Università degli Studi di Padova

Master degree in Physics.

Thesis title: *Hydrodynamics of the FPU problem and its integrable aspects*

Advisor: Antonio Ponno

Dissertation: 23 September 2015

2010 - 2013, Università degli Studi di Padova

Bachelor degree in Physics.

Thesis title: *Gauss's least constraint principle: geometrical and mechanical aspects*

Advisors: Franco Cardin, Kurt Lechner

Dissertation: 16 July 2013

Conferences/Workshops/Schools

Participation to conferences

- *Insubria Summer School in Mathematical Physics. Spectral and scattering theory: from selfadjoint operators to boundary value problems*, Como (Italy), 18 - 22 September 2017;
- *Junior Trieste Quantum Days 2017*, Trieste (Italy), 12, 19 May 2017;
- *Spectral Days 2017*, Stuttgart (Germany), 3 - 7 April 2017;
- *Workshop on Macroscopic Limits of Quantum Systems*, München (Germany), 30 March - 1 April 2017;
- *Trieste Quantum Days 2017*, Trieste (Italy), 20 - 24 February 2017;
- *Linear and Nonlinear Dirac Equation: advances and open problems*, Como (Italy), 8 - 10 February 2017;
- *OTIND - Operator Theory and Indefinite Inner Product Spaces*, Wien (Austria), 17 - 20 December 2016;
- *Mathematical Challenges of Zero-range physics: rigorous results and open problems*, Trieste (Italy), 7 - 10 November 2016
- *Summer School: Universality, Scaling Limits and Effective Theories*, Rome (Italy), 11 - 15 July 2016;
- *Contemporary Trends in the Mathematics of Quantum Mechanics*, Rome (Italy), 4 - 8 July 2016;



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- *Trieste Quantum Days*, Trieste (Italy), 21 - 23 June 2016;
- *Mathematical Challenges in Quantum Mechanics*, Bressanone (Italy), 8 - 13 February 2016.

Scientific visits

- 11-12 December 2017, Milan, I worked with Diego Noja on Dirac-Coulomb Hamiltonians;
- 20-22 November 2017, Como, I worked with Andrea Posilicano and Claudio Cacciapuoti on Dirac-Coulomb Hamiltonians;
- December 2016, Amsterdam, I worked with Bob Rink on *Integrable dynamics of FPU chain*;
- July 2015, Utrecht, I worked with Bob Rink and Antonio Ponno on *Integrable dynamics of FPU chain*;

Organisational duties

- I am one of the organisers of the *Geometry and Mathematical Physics Student Seminars* in SISSA for the academic year 2017/2018.
- I was one of the organisers of the *Analysis, Math-Phys and Quantum Seminars* in SISSA for the academic year 2016/2017.

Publications

Published

- [1] M. Gallone, *Self-adjoint extensions of Dirac-Coulomb operator*, in *Advances in Quantum Mechanics*, G. Dell'Antonio and A. Michelangeli, eds., vol. 18 of INdAM-Springer series, Springer International Publishing, pp. 169-185.

Submitted

- [2] M. Gallone, A. Michelangeli, *Self-adjoint realisations of the Dirac-Coulomb Hamiltonian for heavy nuclei*, submitted to: *Analysis and Math Phys*;
- [3] M. Gallone, A. Michelangeli, A. Ottolini, *Kreĭn-Višik-Birman self-adjoint extension theory revisited*, submitted to: *Documenta Mathematica*
- [4] M. Gallone, A. Michelangeli, *Discrete spectra for critical Dirac-Coulomb Hamiltonians*, submitted to *Journal of Mathematical Physics*

Ongoing projects

- [5] M. Gallone, A. Ponno, B. Rink, *An integrable normal form for the Fermi-Pasta-Ulam system*
- [6] M. Gallone, A. Ponno, B. Rink, *Lower bound estimate of the thermalization time for the Fermi-Pasta-Ulam problem*
- [7] M. Erceg, M. Gallone, A. Michelangeli, *Well-posedness of the two body Dirac-Coulomb system*

Teaching

Introduzione alle Equazioni Differenziali alle Derivate Parziali

Spring 2015, Università degli studi di Padova

High school teacher - Mathematics

November - December 2014, Liceo Artistico Statale M. Guggenheim (Venezia)



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Talks

[Discrete Spectra and Self-Adjointness for Critical Dirac-Coulomb](#)

12 December 2017, Università Milano Bicocca (Milano)

[Self-adjoint realisations of Dirac-Coulomb operators](#)

24 November 2017, SISSA (Trieste), AJS Seminar

[Self-adjoint realisations of the Dirac operator with Coulomb interaction](#)

24 May 2017, SISSA (Trieste), AMPQ Seminar

[Self-adjoint realisations of the Dirac-Coulomb Hamiltonian](#)

12 May 2017, ICTP (Trieste), Junior Trieste Quantum Days

Languages

Italian: mother tongue

English: good