

Giovanna Marcelli

Curriculum Vitae

Personal data

Name **Giovanna Marcelli**
Nationality **Italian**
Date of birth **March 13th, 1990**
Place of birth **Colleferro (Rome), Italy**

Current position

April 2018 – **Postdoc at Eberhard Karls Universität Tübingen, Germany.**
Supervisor: Prof. Dr. Stefan Teufel

Education

- Oct. 2014 – **Ph.D. in Mathematics, University of Rome, “La Sapienza”.**
Oct. 2017 Thesis defence: February 27th, 2018.
Title: “A mathematical analysis of spin and charge transport in topological insulators”.
Supervisor: Prof. Dr. Gianluca Panati (University of Rome, “La Sapienza”).
Referees: Prof. Dr. Eric Cancès (Ecole des Ponts ParisTech, INRIA Paris) and Prof. Dr. Benjamin Schlein (Universität Zürich).
Committee: Prof. Eric Cancès (Ecole des Ponts ParisTech, INRIA Paris), Prof. Dr. Domenico Finco (Università Telematica Internazionale Uninettuno) and Prof. Dr. Alessandro Teta (University of Rome, “La Sapienza”).
- Oct. 2016 – **Erasmus + (Ph.D. level),** Host Institution: Eberhard Karls Universität Tübingen.
Mar. 2017 Title of the project: “Adiabatic theorems and application to quantum spin Hall effect”.
Supervisor at the mobility destination: Prof. Dr. Stefan Teufel.
- Oct. 2012 – **Master Degree in Mathematics, University of Rome, “La Sapienza”.**
Oct. 2014 Title: “Metodi di Bloch–Floquet per il Laplaciano ergodico”.
Supervisors: Prof. Dr. Gianluca Panati and Prof. Dr. Adriano Pisante (University of Rome, “La Sapienza”).
Final mark: 110/110 cum laude.
- April 2015 **Excellence Diploma for Master Degree in Mathematics, University of Rome, “La Sapienza”.**
- Oct. 2009 – **Bachelor Degree in Mathematics, University of Rome, “La Sapienza”.**
Oct. 2012 Title: “Analogie fra la Meccanica classica e l’Ottica geometrica”.
Supervisor: Prof. Dr. Gianluca Panati (University of Rome, “La Sapienza”).
Final mark: 110/110 cum laude.

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- Oct. 2010 – **Diplome at University school of excellence**, “*Fondazione Tullio Levi–Civita*” and
 Oct. 2012 “*International Research Center for Mathematics & Mechanics of Complex System*”,
University of L’Aquila, in Cisterna di Latina (Latina), Italy.
 Coordinator: Prof. Dr. Alberto Maria Bersani (University of Rome, “La Sapienza”).
 Final mark: Excellent.
- Sept. 2004 – **High School Degree**, *Liceo Scientifico (PNI)*, “*Guglielmo Marconi*”, Colferro
 July 2009 (Rome), Italy.
 Final mark: 100/100 cum laude.
- August 2008 **University orientation course**, *one-week course*, (participation reserved to the two
 most proficient students in each high school), *Scuola Normale Superiore di Pisa*,
 Italy.

Experience

Teaching

- Oct. 2019 – **Exercise Classes for “Mathematical Quantum Theory”**, *Master in Mathematical
 Feb. 2020 Physics Program*, Eberhard Karls Universität Tübingen.
 Course duration: winter semester.
- October 2019 **Preparatory Course for the Master in Mathematical Physics Program**, Eber-
 hard Karls Universität Tübingen.
 Course duration: 60 hours.
- Apr. 2019 – **Exercise Classes for “Linear Algebra”**, *Bachelor of Science*, Eberhard Karls Uni-
 July 2019 versität Tübingen.
 Course duration: summer semester.
- Oct. 2018 – **Exercise Classes for “Geometry in Physics”**, *Master in Mathematical Physics
 Feb. 2019 Program*, Eberhard Karls Universität Tübingen.
 Course duration: winter semester.
- October 2018 **Preparatory Course for the Master in Mathematical Physics Program**, Eber-
 hard Karls Universität Tübingen.
 Course duration: 30 hours.
- Apr. 2018 – **Exercise Classes for “Non-Linear Dispersive Partial Differential Equations”**,
 July 2018 *Master in Mathematical Physics Program*, Eberhard Karls Universität Tübingen.
 Course duration: summer semester.
- May 2016 **Istituzioni di Fisica Matematica**, *Master in Mathematics*, University of Rome,
 “La Sapienza”.
 Two two-hour lectures to conclude the course taught by Prof. Dr. Mario Pulvirenti.
- September **Preparatory Course in Mathematics**, *Faculty of Information Engineering, Infor-
 2015 matics, and Statistics*, University of Rome, “La Sapienza”.
 Course duration: 24 hours.

Awards

- 2016 August **Start-up research funds** for the project: “Adiabatic theorems and application to
 quantum spin Hall effect”, University of Rome, “La Sapienza”.

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2/5

- 2016 March **Erasmus + mobility fellowship (Ph.D. level)** for the project: “Adiabatic theorems and application to quantum spin Hall effect”, University of Rome, “La Sapienza”. Mobility destination: Eberhard Karls Universität Tübingen, Germany and supervisor at the mobility destination: Prof. Dr. Stefan Teufel.
- 2014 October **Ph.D. fellowship**, University of Rome, “La Sapienza”.
- 2013 October **Excellence Class for Master Degree in Mathematics**, University of Rome, “La Sapienza”.
- Oct. 2010 – **Fellowship** at University school of excellence, “Fondazione Tullio Levi-Civita” and
 Oct. 2012 “International Research Center for Mathematics & Mechanics of Complex System”, University of L’Aquila (Coordinator: Prof. Dr. Alberto Maria Bersani (University of Rome, “La Sapienza”)).
- 2010 January **“Anna Norvano Baiocchi” Award**, Comune di Colferro (Rome).

Research

Research field **Mathematical physics**

I am interested in mathematical problems arising from condensed matter physics, specially related to charge and spin (topological) transport in quantum systems with gap or mobility gap. In particular, my research is aimed to prove the validity of linear response paradigm by using adiabatic theory.

Publications

1. **Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms** (with Gianluca Panati and Clément Tauber). *Ann. Henri Poincaré* (2019). <https://doi.org/10.1007/s00023-019-00784-5>.
2. **The Haldane model and its localization dichotomy** (with Domenico Monaco, Massimo Moscolari and Gianluca Panati). *Rend. Mat. Appl.* **39**, Issue 2 (2018), 307–327. [http://www1.mat.uniroma1.it/ricerca/rendiconti/ARCHIVIO/2018\(2\)/307-327.pdf](http://www1.mat.uniroma1.it/ricerca/rendiconti/ARCHIVIO/2018(2)/307-327.pdf).

Preprints

1. **Improved energy estimates for a class of time-dependent perturbed Hamiltonians**. Preprint available at [arXiv:1904.11300](https://arxiv.org/abs/1904.11300) (2019).

Papers in preparation

1. **A new approach to transport coefficients in the quantum (spin) Hall effect** (with Gianluca Panati and Stefan Teufel). To appear on [arXiv.org](https://arxiv.org).
2. **Localization implies topological triviality** (with Massimo Moscolari and Gianluca Panati).
3. **Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems** (with Stefan Teufel).

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Scientific communications

Invited talks

- 3-4 February 2020 **Noncommutative Geometry, Analysis, and Topological Insulators**, *Leiden University*, Mathematisch Instituut.
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect.*
- 4-5 July 2019 **Tübingen-Zürich Meeting in Mathematical Physics**, *Eberhard Karls Universität Tübingen*, Department of Mathematics.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems.*
- 15 April 2019 **Stuttgart-Tübingen GRK-Seminar**, *Universität Stuttgart*, Department of Mathematics.
Title of the talk: *Improved energy estimates for a class of perturbed Hamiltonian.*
- 3-6 Sept. 2018 **Recent progress in mathematics of topological insulators**, *ETH Zürich*.
Title of the talk: *Quantum (spin) Hall conductivity: Kubo-like formula (and beyond).*
- 1-3 August 2018 **SOLID MATH 2018**, *McGill University*, Montréal (Canada).
Title of the talk: *Derivation of a Kubo-like formula for charge and spin transport.*
- 8-10 July 2015 **Trails in Quantum Mechanics and Surroundings 2015**, *Università dell'Insubria*, Como (Italy).
Title of the talk: *The analogies between prototypes of periodic Schrödinger operators via Bloch-Floquet methods and the ergodic Laplacian.*

Contributed talks

- 16-20 Sept. 2019 **Quantum Transport and Universality, From Topological Materials to Quantum Hydrodynamics**, *Università degli Studi Roma Tre*, Dipartimento di Matematica e Fisica.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems.*
- 12-16 August 2019 **QMath14: Mathematical Results in Quantum Physics**, *Aarhus University*, Department of Mathematics.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems.*
- 23-28 July 2019 **XIX International Congress on Mathematical Physics**, *Centre Mont Royal*, Montréal (Canada).
Title of the talk: *Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms.*
- 20-21 July 2019 **Young Researchers Symposium**, *McGill University*, Montréal (Canada).
Title of the talk: *Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms.*
- 21-27 April 2019 **Mathematical Methods in Quantum Molecular Dynamics**, *MFO, Oberwolfach Research Institute for Mathematics*, (Germany).
Title of the talk: *Quantum (spin) Hall conductivity: Kubo-like formula (and beyond).*

Service to the scientific community and professional affiliations

Reviewer Reviews in Mathematical Physics.

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2015 – Affiliation: Gruppo Nazionale per la Fisica Matematica, Istituto Nazionale di Alta Matematica (GNFM-INdAM).

Spoken languages

Italian **Mother tongue**
English **Fluent**
German **Basic**

Tübingen, February 27, 2020

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5/5