

# DAVIDE FERMI

## Curriculum Vitae et Studiorum

### Personal Data

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Name and surname: Davide Fermi  
Place and date of birth: Melzo (Milan, Italy), 1 August 1988  
Citizenship: Italian  
Civil status: married with Erika Ghidini since 25 July 2015,  
one child born on 7 October 2018

Work address: Dipartimento di Matematica e Fisica  
Università degli Studi Roma Tre  
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Webpage: <https://fermidavide.com>

Spoken Languages: Italian: mother tongue  
English: fluent

Orcid ID: 0000-0002-4651-1784  
Scopus Author ID: 54383178400  
Researcher ID: S-6536-2018  
MR Author ID: 1142559



### Academic Positions

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01/06/2021 - present **Researcher** in Mathematical Physics  
(RTD-a – art.24, c.3–a, legge 240/2010, s.c. 01/A4, s.s.d. MAT/07 Fisica Matematica)  
Università degli Studi Roma Tre, Mathematics and Physics Dep. (Roma, Italy)  
Position funded by ERC consolidator grant UniCoSM (PI: Prof. Alessandro Giuliani)

01/01/2021 - 31/05/2021 **Postdoc**, Università degli Studi di Roma La Sapienza, Mathematics Dep. (Roma, Italy)  
Project: “*Metodi matematici in meccanica quantistica*”  
(transl. “*Mathematical methods in quantum mechanics*”)  
Supervisor: Prof. Alessandro Teta

02/03/2020 - 31/12/2020 **Postdoc**, Scuola Normale Superiore, Classe di Scienze (Pisa, Italy)  
Project: “*Aspetti matematici della fisica della materia condensata*”  
(transl. “*Mathematical aspects of condensed matter physics*”)  
Supervisor: Prof. Michele Correggi

01/12/2016 - 29/02/2020 **Postdoc**, Università degli Studi di Milano, Mathematics Department (Milano, Italy)  
Project: “*Metodi analitici e geometrici per le equazioni differenziali e la teoria quantistica dei campi*” (transl. “*Analytical and geometrical methods for differential equations and quantum field theory*”)  
Supervisors: Prof. Marco M. Peloso and Prof. Livio Pizzocchero

15/04/2016 - 30/11/2016 **Postdoc**, Università degli Studi dell’Insubria, DiSAT (Como, Italy)  
Project: “*Problemi matematici nella fisica della materia condensata - FIR 2013*”  
(transl. “*Mathematical problems in condensed matter physics*”)  
Supervisors: Dr. Claudio Cacciapuoti and Prof. Andrea Posilicano

### Qualifications and Education

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2020 **Abilitazione Scientifica Nazionale** for Associate Professor in Mathematical Physics  
(Professore di II Fascia, s.c. 01/A4 Fisica Matematica, valid from 09/11/2020 until 09/11/2029)

2012 - 2016 **Ph.D. degree in Mathematics**, Università degli Studi di Milano, Math. Dep. (Milano, Italy)  
(XXVIII cycle, with scholarship)  
Thesis: “*A functional analytic framework for local zeta regularization and the scalar Casimir effect*”  
defended in Milan, Italy on 22 February 2016  
Advisor: Prof. Livio Pizzocchero

- 2010 - 2012 **Master degree in Physics**, Università degli Studi di Milano, Physics Dep. (Milano, Italy)  
 Thesis: “*L’Effetto Casimir e la Regolarizzazione Zeta*”  
 (transl. “*Zeta regularization and the Casimir effect*”)  
 defended in Milan, Italy on 24 July 2012  
 Marks: 110/110 *magna cum laude*  
 Advisor: Prof. Livio Pizzocchero  
 Co - advisor: Prof. Franco Gallone
- 2007 - 2010 **Bachelor degree in Physics**, Università degli Studi di Milano, Physics Dep. (Milano, Italy)  
 Thesis: “*Lo Spaziotempo di Alcubierre*” (transl. “*Alcubierre’s spacetime*”)  
 defended in Milan, Italy on 21 October 2010  
 Marks: 110/110 *magna cum laude*  
 Advisor: Prof. Livio Pizzocchero
- 2002 - 2007 **Italian High School diploma**, Liceo Scientifico Statale Giordano Bruno, Melzo (Milan, Italy)  
 (diploma di Maturità Scientifica PNI - Piano Nazionale Informatica)  
 Marks: 100/100

## Honors and awards

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- 09/2021 **Shortlisted** (2<sup>nd</sup> place) for Associate Professor position in mathematical physics  
 (Professore Associato, s.c. 01/A4, s.s.d. MAT/07)  
 Università di Bologna, Dip. Matematica (Bologna, Italy)  
 Selection committee: Prof. Maria Letizia Bertotti, Prof. Pierluigi Contucci, Prof. Maria Groppi
- 03/2021 **Winner** of non-tenured researcher position in mathematical physics  
 (RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
 funded by ERC Consolidator Grant “*Universality in Condensed Matter and Statistical Mechanics*”  
 Università degli Studi di Roma Tre, Dip. Matematica e Fisica (Roma, Italy)  
 Selection committee: Prof. Michele Correggi, Prof. Alessandro Giuliani, Prof. Marcello Porta
- 2019/2020 **Shortlisted** (6<sup>th</sup> place, >20 participants) for a permanent full-time researcher position at INdAM  
 (concorso pubblico per titoli ed esami per l’assunzione con contratto di lavoro a tempo pieno e indeterminato di una unità di personale Profilo Ricercatore, III Livello Professionale presso l’Istituto Nazionale di Alta Matematica “Francesco Severi”),  
 Selection procedure: 1 preliminary written evaluation, 2 written exams, 1 oral exam  
 (8 participants selected for final stage).  
 Selection committee: Prof. Dario Bambusi, Prof. Carla Manni, Prof. Marco Romito
- 11/2020 **Winner** of a 1 – year postdoc scholarship (assegno di ricerca)  
 funded by Università degli Studi di Roma “La Sapienza”, Dip. Matematica (Roma, Italy)  
 Selection committee: Dott. Domenico Monaco, Prof. Gianluca Panati, Prof. Alessandro Teta
- 01/2020 **Winner** (2 participants) of a 2 – years postdoc scholarship (assegno di ricerca) at SISSA, Trieste,  
 funded by ERC Starting Grant “*MaMBoQ-Macroscopic Behavior of Many-Body Quantum Systems*”  
 (I renounced the assignment in favour of a postdoc scholarship at Scuola Normale Superiore).  
 Selection committee: Prof. Gianni dal Maso, Prof. Marcello Porta, Prof. Ludwik Dabrowski
- 01/2020 **Winner** (2 participants) of a 1 – year postdoc scholarship (assegno di ricerca),  
 funded by Scuola Normale Superiore (Faculty of Sciences).  
 Selection committee: Prof. Michele Correggi, Prof. Andrea Malchiodi, Prof. Stefano Marmi
- 08/2016 **Winner** (2<sup>nd</sup> place, 7 participants) of a 2 – years renewable postdoc scholarship (assegno di ricerca),  
 funded by Università degli Studi di Milano, Dip. Matematica (Milano, Italy).  
 Selection committee: Prof. Giovanni Gallavotti, Prof. Valter Moretti, Prof. Marco Rigoli
- 03/2016 **Winner** (3 participants) of a 1 – year postdoc scholarship (assegno di ricerca),  
 funded by FIR project 2014-2017 “*COND-MATH - Condensed Matter in Mathematical Physics*”,  
 Università degli Studi dell’Insubria, DiSAT (Como, Italy).  
 Selection committee: Prof. Claudio Cacciapuoti, Prof. Andrea Posilicano, Dott.ssa Stefania Ugolini
- 11/2012 **Winner** (1<sup>st</sup> place, 26 participants) of a 3 – years Ph.D. scholarship funded by MIUR (Italy),  
 Università degli Studi di Milano, Dip. Matematica (Milano, Italy).  
 Selection committee: Prof. Livio Pizzocchero, Prof. Paolo Stellari, Prof. Enrico Valdinoci

## Further academic competitions

- 01/2021 **Shortlisted** for tenured researcher position in mathematical physics  
 (RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
 Università degli Studi di Roma Tre, Dip. Matematica e Fisica (Roma, Italy)  
 Selection committee: Prof. Paolo Buttà, Prof. Alessandro Giuliani, Prof. Fabio Lucio Toninelli
- 01/2021 **Shortlisted** for tenured researcher position in mathematical physics  
 (RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
 Università degli Studi di Roma “La Sapienza”, Dip. Matematica (Roma, Italy)  
 Selection committee: Prof. Fabio Bagarello, Prof.ssa Giada Basile, Prof. Giuseppe Gaeta

- 01/2022 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Genova, Dip. Matematica (Genova, Italy)  
Selection committee: Prof. Roberto Cianci, Prof. Gaetano Fiore, Prof.ssa Rita Tracinà
- 12/2021 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Pavia, Dip. Matematica (Pavia, Italy)  
Selection committee: Prof. Giuseppe Gaeta, Prof.ssa Annalisa Marzuoli, Prof.ssa Elena Vuk
- 09/2021 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Torino, Dip. Matematica “Giuseppe Peano” (Torino, Italy)  
Selection committee: Prof. Gregorio Falqui, Prof. Lorenzo Fatibene, Prof. Addolorata Marasco
- 05/2021 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università Cattolica del Sacro Cuore, Facoltà di Scienze matematiche, fisiche e naturali (Brescia, Italy)  
Selection committee: Prof. Alfio Grillo, Prof. Alfredo Marzocchi, Prof. Giuseppe Saccomandi
- 05/2021 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Modena e Reggio Emilia, Dip. Scienze Fisiche, Informatiche e Matematiche  
Selection committee: Prof. Roberto Cianci, Prof. Claudio Giberti, Prof. Lamberto Rondoni
- 03/2021 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Parma, Dip. Scienze Matematiche, Fisiche e Informatiche (Parma, Italy)  
Selection committee: Prof. Luigi Barletti, Prof. Maria Groppi, Prof. Andrea Tosin
- 01/2021 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Palermo, Dip. Ingegneria (Palermo, Italy)  
Selection committee: Prof. Florinda Capone, Prof. Maria Groppi, Prof. Vittorio Romano
- 12/2020 **Shortlisted** for tenured researcher position in mathematical physics  
(RTD-b, s.c. 01/A4, s.s.d. MAT/07)  
Politecnico di Milano, Dip. Matematica (Milano, Italy)  
Selection committee: Prof. Michele Correggi, Prof. Diego Noja, Prof. Alessandro Giuliani
- 12/2020 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Genova, Dip. Matematica (Genova, Italy)  
Selection committee: Prof. Cristian Giardinà, Prof. Maria Grazia Naso, Prof. Stefano Vignolo
- 12/2020 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Milano, Dip. Matematica “Federigo Enriques” (Milano, Italy).  
Selection committee: Prof. Giuseppe Gaeta, Prof. Maria Groppi, Prof. Marcello Porta
- 11/2020 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
SISSA - Scuola Internazionale Superiore di Studi Avanzati (Trieste, Italy)  
Selection committee: Prof. Giada Basile, Prof. Alessandro Giuliani, Prof. Marcello Porta
- 07/2019 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Roma “La Sapienza”, Dip. Matematica (Roma, Italy)  
Selection committee: Prof. Alessandro Giuliani, Prof. Diego D. Noja, Prof. Alessandro Teta
- 05/2019 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Firenze, Dip. Matematica e Informatica “Ulisse Dini” (Firenze, Italy)  
Selection committee: Prof. Luigi Barletti, Prof. Luigi Preziosi, Prof. Fabio Rosso
- 02/2019 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università degli Studi di Milano Bicocca, Dip. Matematica e Applicazioni (Milano, Italy).  
Selection committee: Prof. Gregorio Falqui, Prof. Annalisa Marzuoli, Prof. Marco Pedroni
- 11/2018 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
GSSI - Gran Sasso Science Institute (l’Aquila, Italy)  
Selection committee: Prof. Paolo Buttà, Prof. Andrea Sacchetti, Prof. Alessandro Teta

05/2018 **Shortlisted** for non-tenured researcher position in mathematical physics  
(RTD-a, s.c. 01/A4, s.s.d. MAT/07)  
Università Cattolica del Sacro Cuore, Facoltà di Scienze matematiche, fisiche e naturali (Brescia, Italy)  
Selection committee: Prof. Paolo Maremonti, Prof. Alfredo Marzocchi, Prof. Luciano Teresi

## Scientific Works

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### Preprints

2. D. Fermi, A. Giuliani,  
*Periodic striped states in Ising models with dipolar interactions*,  
arXiv:2203.01249 [math-ph] (2022)
1. D. Fermi, L. Pizzocchero,  
*A note on “Algebraic approach to Casimir force between two  $\delta$ -like potentials”* (K. Ziemian, *Ann. Henri Poincaré, Online First, 2021*),  
arXiv:2104.11029 [quant-ph] (2021)

### Books

1. D. Fermi, L. Pizzocchero,  
*Local zeta regularization and the scalar Casimir effect. A general approach based on integral kernels*,  
World Scientific Publishing, Singapore (2017) [276 pages]  
ISBN: 978-981-3224-99-5 (hardcover), ISBN: 978-981-3225-01-5 (ebook); arXiv:1505.00711, arXiv:1505.01044

### Published papers

18. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*The semi-classical limit with a delta-prime potential*,  
*Rev. Math. Phys. online ready* (2022)  
DOI:10.1142/S0129055X22500155; arXiv:2012.12735 [math-ph]
17. D. Fermi,  
*Vacuum polarization with zero-range potentials on a hyperplane*,  
*Universe* **2021**, 7(4) (2021), 92 [27 pages] (*invited feature article*)  
DOI:10.3390/universe7040092; arXiv:2103.13720 [math-ph]
16. M. Correggi, D. Fermi,  
*Magnetic perturbations of anyonic and Aharonov-Bohm Schrödinger operators*,  
*J. Math. Phys.* **62**(3) (2021), 032101 [25 pages]  
DOI:10.1063/5.0018933; arXiv:2006.09056 [math-ph]
15. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*The semiclassical limit on a star-graph with Kirchhoff conditions*,  
*Analysis and Math. Phys.* **11** (2021), 45 [43 pages]  
DOI:10.1007/s13324-020-00455-3; arXiv:2005.03790 [math-ph]
14. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*Scattering theory for delta-potentials supported by locally deformed planes*,  
pp. 35–55 in A. Michelangeli (Ed.), “Mathematical Challenges of Zero-Range Physics”, Springer (2021) [20 pp]  
DOI:10.1007/978-3-030-60453-0\_2
13. D. Fermi, M. Gengo, L. Pizzocchero,  
*Integrable scalar cosmologies with matter and curvature*,  
*Nucl. Phys. B* **957** (2020), 115095 [102 pages]  
DOI:10.1016/j.nuclphysb.2020.115095; arXiv:2001.03228 [gr-qc]
12. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*The semi-classical limit with a delta potential*,  
*Annali di Matematica Pura ed Applicata* (2020), **200**(2), 453–489 [37 pages]  
DOI:10.1007/s10231-020-01002-4; arXiv:1907.05801 [math-ph]
11. D. Fermi,  
*The Casimir energy anomaly for a point interaction*,  
*Mod. Phys. Lett. A* **35**(03) (2020), 2040008 [5 pages]  
DOI:10.1142/S0217732320400088; arXiv:1909.00604 [math-ph]
10. D. Fermi,  
*Some remarks on a new exotic spacetime for time travel by free fall*,  
pp. 243–265 in S. Cacciatori, B. Güneysu, S. Pigola (Eds.), “Einstein Equations: Physical and Mathematical Aspects of General Relativity. DOMOSCHOOL 2018”, Birkhäuser, Cham, Springer Nature Switzerland AG (2019) [23 pages]  
DOI:10.1007/978-3-030-18061-4\_8; arXiv:1812.09021 [gr-qc]

9. D. Fermi, M. Gengo, L. Pizzocchero,  
*On the necessity of phantom fields for solving the horizon problem in scalar cosmologies*,  
Universe **2019**, 5(3) (2019), 76 [20 pages] (*invited feature article*)  
DOI:10.3390/universe5030076; arXiv:1901.11511 [gr-qc]
8. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*Scattering from local deformations of a semitransparent plane*,  
J. Math. Anal. Appl. **473**(1) (2019), 215-257 [43 pages]  
DOI:10.1016/j.jmaa.2018.12.045; arXiv:1807.07916 [math-ph]  
*Corrigendum*,  
J. Math. Anal. Appl. **482**(1) (2020), 123554 [2 pages]  
DOI:10.1016/j.jmaa.2019.123554
7. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*On inverses of Krein's Q-functions*,  
Rend. Mat. Appl. (7) **39**(2) (2018), 229-240 [12 pages]  
Editor's page; arXiv:1809.05150 [math.SP]
6. D. Fermi, L. Pizzocchero,  
*A time machine for free fall into the past*,  
Class. Quant. Grav. **35**(16) (2018), 165003 [42 pages]  
DOI:10.1088/1361-6382/aace6e; arXiv:1803.08214 [gr-qc]
5. D. Fermi, L. Pizzocchero,  
*Local Casimir Effect for a Scalar Field in Presence of a Point Impurity*,  
Symmetry **2018**, **10**(2) (2018), 38 [20 pages] (*invited contribution in I. H. Brevik, K. A. Milton (guest Eds.),  
Special Issue of Symmetry "Casimir Physics and Applications"*)  
DOI:10.3390/sym10020038; arXiv:1712.10039 [math-ph]
4. C. Cacciapuoti, D. Fermi, A. Posilicano,  
*Relative-Zeta and Casimir energy for a semitransparent hyperplane selecting transverse modes*,  
pp. 71-97 in G.F. Dell'Antonio and A. Michelangeli (Eds.), "Advances in Quantum Mechanics: contemporary  
trends and open problems", Springer (2017) [26 pages]  
DOI:10.1007/978-3-319-58904-6\_5; arXiv:1702.05296 [math-ph]
3. D. Fermi, L. Pizzocchero,  
*Local zeta regularization and the scalar Casimir effect IV. The case of a rectangular box*,  
Int. J. Mod. Phys. A **31**(04&05) (2016), 1650003 [56 pages]  
DOI:10.1142/S0217751X16500032; arXiv:1505.03276 [math-ph]
2. D. Fermi, L. Pizzocchero,  
*Local zeta regularization and the scalar Casimir effect III. The case with a background harmonic potential*,  
Int. J. Mod. Phys. A **30**(35) (2015), 1550213 [42 pages]  
DOI:10.1142/S0217751X15502139; arXiv:1505.01651 [math-ph]
1. D. Fermi, L. Pizzocchero,  
*Local Zeta Regularization and the Casimir Effect*,  
Prog. Theor. Phys. **126**(3) (2011), 419-434 [15 pages]  
DOI:10.1143/PTP.126.419; arXiv:1104.4330 [math-ph]

## Invited Talks

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- 2021 "*Homogenization limit for multiple Aharonov-Bohm fluxes*",  
invited talk at *Quantum before Christmas - Mathematical Physics from Many-Body Quantum Systems to  
Normal Forms*, Università degli Studi di Milano, Dip. Matematica, 20 - 22 December 2021.
- 2021 "*An axiomatic zeta-function approach to Casimir physics*",  
Karlsruher Institut für Technologie, Zoom online seminar, 31 May 2021.
- 2021 "*Semiclassical limit with zero-range potentials in one dimension*",  
"Sapienza" Università degli Studi di Roma, Dip. Matematica, Google Meet online seminar, 5 May 2021.
- 2020 "*Magnetic perturbations of anyonic and Aharonov-Bohm Hamiltonians*",  
Scuola Normale Superiore, Microsoft Teams online seminar, 9 December 2020.
- 2019 "*Casimir energy and relative zeta function for a semitransparent plane*",  
Università degli Studi di Genova, Dip. Matematica, 21 May 2019.
- 2019 "*Zeta regularization in the scalar Casimir effect*",  
invited talk at *1st Vacuum Fluctuations at Nanoscale and Gravitation conference: theory and experiments*,  
Orosei, 28 April - 3 May 2019.
- 2018 "*Free fall into the past. A time-orientable spacetime model with closed timelike curves and no curvature  
singularity*",  
Università degli Studi di Milano, Dip. Matematica, 18 January 2018.

- 2017 “*Local Casimir effect and  $\zeta$ -regularization: scalar field in a rectangular box*”, invited talk at *QFT Day in Milan: mathematical aspects of renormalization*, Università degli Studi di Milano, Dip. Matematica, 13 April 2017.
- 2017 “*Zeta regularization and Casimir effect for a scalar field with singular background potentials*”, invited talk at *Microlocal analysis: a tool to explore the quantum world*, Università degli Studi di Genova, Dip. Matematica, 12 – 13 January 2017.
- 2016 “*Zeta-function regularization in Wightman scalar field theory and applications to the Casimir effect*”, invited talk at *Workshop in Mathematical Physics*, ETH Zürich 28 – 30 November 2016.
- 2016 “*Casimir energy for singular potentials concentrated on a plane*”, invited talk at *Mathematical Challenges of Zero-Range Physics: rigorous results and open problems*, SISSA Trieste 7 – 10 November 2016.
- 2015 “*A functional analytic framework for local zeta regularization and the scalar Casimir effect*”, Università degli Studi di Trento, Dip. Matematica, 5 October 2015.
- 2011 “*La regolarizzazione zeta locale e l’effetto Casimir*” (transl. “*Local zeta regularization and the Casimir effect*”), Università degli Studi di Milano, Dip. Matematica, 28 June 2011.

## Contributed Talks & Posters

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- 2021 “*The semiclassical limit with zero-range potentials*”, poster at *International Congress on Mathematical Physics (ICMP 2021)*, Geneva, 2 – 7 August 2021.
- 2020 “*Magnetic perturbations of Aharonov-Bohm and 2-body anyonic Hamiltonians*”, contributed talk at *Mathematics of Condensed Matter and Beyond (MCMB)*, American University of Beirut - online Zoom conference, 22 – 25 February 2021.
- 2019 “*Scattering from local deformations of a semitransparent plane*”, contributed talk at *XXI Congresso dell’Unione Matematica Italiana*, Università degli Studi di Pavia, 2 – 7 September 2019.
- 2019 “*Scalar Casimir effect for delta-type potentials*”, contributed talk at *10th Alexander Friedmann International Seminar on Gravitation and Cosmology, and 4th Symposium on the Casimir Effect*, Saint Petersburg Polytechnic University, 23 – 29 June 2019.
- 2018 “*Free fall into the past*”, contributed talk at *DOMOSCHOOL - International Alpine School of Mathematics and Physics. Einstein’s Equations: Physical and Mathematical Aspects of General Relativity*, Domodossola, 16 – 20 July 2018.
- 2018 “*Some results on scattering theory for delta interactions concentrated on deformed planes*”, contributed talk at *Mathematical Challenges in Quantum Mechanics 2018*, “Sapienza” Università degli Studi di Roma, 19 – 24 February 2018.
- 2016 “*Zeta regularization and the Casimir effect: a functional analytic framework*”, contributed talk at *Mathematical Challenges in Quantum Mechanics 2016*, Bressanone, 8 – 13 February 2016.
- 2015 “*Local zeta regularization and the scalar Casimir effect*”, contributed talk at *Assemblea Scientifica GNFM*, Montecatini, 22 – 24 October 2015.

## Research Projects and Funding

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- **Participant** to **ERC Consolidator Grant 2016** “*UniCoSM - Universality in Condensed Matter and Statistical Mechanics*” (from June 2021)  
Principal investigator: Prof. Alessandro Giuliani
- **Participant** to **Progetto Giovani GNFM 2020** “*Emergent Features in Quantum Bosonic Theories and Semiclassical Analysis*”  
Principal investigator: Dr. Marco Falconi
- **Participant** to **INFN Project 2017-2019** “*BELL - Fundamental Problems in Quantum Physics*”  
National coordinator: Prof. Pierantonio Zanghi                      Local coordinator: Prof. Bassano Vacchini
- **Participant** to **Progetto Giovani GNFM 2017** “*Quasi-classical dynamics for the polaron model*”  
Principal investigator: Prof. Raffaele Carlone
- **Participant** to **FIR project 2014-2017** “*COND-MATH - Condensed Matter in Mathematical Physics*” (University of Insubria Unit, from April 2016)  
Principal investigator: Prof. Michele Correggi
- **Participant** to **MIUR - PRIN 2010 - 2011** “*Teorie geometriche e analitiche dei sistemi Hamiltoniani in dimensioni finite e infinite*” (transl. “*Geometric and analytic theories of Hamiltonian systems in finite and infinite dimensions*”)  
National coordinator: Prof. Boris A. Dubrovin                      Local coordinator: Prof. Dario P. Bambusi

## Invited visiting

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2020 Visiting professor at Scuola Normale Superiore di Pisa,  
Pisa, 12–14 February 2020.

2016 Visiting scientist at SISSA (International School for Advanced Studies, Trieste),  
Trieste, 26–29 September 2016.

## Supervised Students

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- Marco Mastronicola, M.Sc. in Theoretical Physics, Università degli Studi di Pavia, Physics Department  
Thesis: “*Backreaction of a scalar quantum field on a wormhole spacetime in semiclassical gravity*”  
Dissertation date: 25 February 2022  
Co-supervised with Prof. Claudio Dappiaggi and Prof. Livio Pizzocchero
- Guglielmo Moroni, M.Sc. in Theoretical Physics, Università degli Studi di Milano, Physics Department  
Thesis: “*Scalar Casimir effect on a line in presence of delta-interaction*”  
Dissertation date: 2 April 2020  
Co-supervised with Prof. Livio Pizzocchero

## Teaching activity

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Total hours of teaching activity: 320 (+ 30 from March 2022 to June 2022)

Total hours of support for exams: 60

- Course “Algebra Lineare per il Machine Learning” for the master degree in Computational Sciences, Università degli Studi di Roma Tre, academic year 2021/2022 (30 hours of theory lectures, to be held from March 2022 to June 2022).
- Course “Matematica - Modulo 1” (basic mathematics course) for the B.Sc. degree in Geological Sciences, Università degli Studi di Roma Tre, academic year 2021/2022 (24 hours of theory lectures, 36 hours of exercise lectures).
- Teaching assistant for “Meccanica Razionale” (Analytical Mechanics) for the B.Sc. degree in Materials and Nanotechnology Engineering, Politecnico di Milano, academic year 2020/2021 (20 hours of blended teaching).
- ‘*Stati legati in guide d’onda*’ (‘*Bound states in waveguides*’), introductory seminar for the MCQM Seminar by Pavel Exner ‘*Discrete spectrum of two-dimensional soft waveguides*’, Politecnico di Milano, 11 January 2021.
- Teaching assistant for “Fisica Matematica” (Mathematical Physics) for the B.Sc. degree in Mathematics, Università degli Studi dell’Insubria, academic year 2020/2021 (12 hours of online teaching activity).
- Teaching assistant for “Meccanica Analitica” (Analytical Mechanics) for the B.Sc. degree in Physics, Università degli Studi di Milano, academic years 2017/2018, 2018/2019, 2019/2020 (20 hours of teaching activity per year).
- Teaching assistant for “Matematica del continuo” (basic mathematics course) for the B.Sc. degree in Computer Science, Università degli Studi di Milano, academic years 2014/2015, 2015/2016 (48 hours of teaching activity, 20 hours of support for exams per year).
- Teaching assistant for “Istituzioni di matematica” (basic mathematics course) for the B.Sc. degree in Computer Science, Università degli Studi di Milano, academic year 2013/2014 (48 hours of teaching activity, 20 hours of support for exams).
- Freshmen tutor for “Corsi di azzeramento” (mathematics pre-introductory course) for the B.Sc. degree in Biological Sciences, Università degli Studi di Milano, September 2014 (24 hours of teaching activity).

## Referee and Reviewer activity

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Reviewer for

- Mathematical Reviews (American Mathematical Society)
- zbMath

Referee for the following journals

- *Classical and Quantum Gravity* (by IOP Science)
- *Communications in Mathematical Physics* (by Springer)
- *European Journal of Physics* (by IOP Science)
- *European Physical Journal C* (by Springer)
- *International Journal of Geometric Methods in Modern Physics* (by World Scientific)
- *Journal of Physics A: Mathematical and Theoretical* (by IOP Science)
- *Journal of Physics G: Nuclear and Particle Physics* (by IOP Science)
- *Journal of Statistical Physics* (by Springer)
- *Physica Scripta* (by IOP Science)
- *Universe* (by MDPI)

## Affiliations

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- Member of the “*Unione Matematica Italiana*” (UMI) since 2019.
- Member of the “*International Association of Mathematical Physics*” (IAMP) since 2017.
- Member of the “*Istituto Nazionale di Fisica Nucleare*” (INFN, Italian National Institute for Nuclear Physics) from March 2017 to March 2020.
- Member of the “*Gruppo Nazionale per la Fisica Matematica*” (INdAM-GNFM, Italian National Group for Mathematical Physics) since 2015.

## Administration Posts

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- Representative of postdoc researchers at the Department Council (“*Consiglio di Dipartimento*”) of the Department of Mathematics, Università degli Studi di Milano, academic years 2017/2018, 2018/2019, 2019/2020.
- Member of the Didactic Board (“*Collegio Didattico*”) of the Department of Physics, Università degli Studi di Milano, academic years 2017/2018, 2018/2019, 2019/2020.

## Citation Metrics

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	Scopus	Web of Science	Google Scholar
Number of publications	18	31*	25
Total number of citations	74	51	112
Average number of citations per paper	4.11	1.65*	4.448
H-index	6	6	8

\*The chapters of the book “*Local zeta regularization and the scalar Casimir effect. A general approach based on integral kernels*” (World Scientific Publishing, Singapore 2017) are counted as separate publications.

## Research Interests

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- Classical spin systems with competing interactions.
- Emergence of Efimov effect in few body quantum systems.
- Schrödinger operators with Aharonov-Bohm potentials; anyonic systems and fractional statistics.
- Schrödinger operators with singular potentials; perturbations of self-adjoint operators and self-adjoint extensions of symmetric operators; scattering theory for non-relativistic quantum particles; semi-classical limit; quantum graphs.
- Mathematical aspects of relativistic quantum field theories (axiomatic QFT); zeta-regularization and its applications to the renormalization of vacuum expectation values; Casimir effect for a scalar field in presence of external potentials or classical boundaries.
- Exotic solutions of Einstein’s field equations; violations of the classical positive energy conditions; non-standard causal structures with closed timelike curves; scalar field models for early-stage inflation in cosmology.

## Attended Schools and Meetings

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- 2022 “*INdAM Quantum Meetings - IQM22*”, <https://sites.google.com/view/iqm22/home>, March 2022 - May 2022.
- 2022 “*One World IAMP Mathematical Physics Seminar Series*”, [http://www.iamp.org/page.php?page=page\\_seminar](http://www.iamp.org/page.php?page=page_seminar), May 2020 - April 2022.
- 2022 “*Mathematical Challenges in Quantum Mechanics - MCQM seminars*”, <https://www.mcqm.it/talks/>, December 2020 - April 2022.
- 2021 “*Statistical and Quantum Mechanics: reconsidering their foundations in the light of new cutting edge experiments and theoretical models*”, <https://indico.gssi.it/event/93/>, 20–23 September 2021.
- 2021 “*Seminari delle Meccaniche*”, <https://agenda.infn.it/category/1345/>, February – June 2021.
- 2021 “*Mathematical Challenges in Quantum Mechanics 2021 - MCQM miniworkshop*”, <https://mcqm.it/workshop21.html>, 14–15 June 2021.
- 2021 “*Gran Sasso Quantum Meetings @GSSI: From Equilibrium Phenomena Towards Open Quantum Systems*”, <https://indico.gssi.it/event/103/>, 22–26 March 2021.
- 2020 “*Online Minisymposium: Nonlinear Dynamics in Quantum Mechanics*”, [http://math.jacobs-university.de/petrat/conferences/2020\\_nonlinear\\_dynamics/index.html](http://math.jacobs-university.de/petrat/conferences/2020_nonlinear_dynamics/index.html), 1–2 October 2020.
- 2020 “*Mathematical Methods in Field Theory and Quantum Mechanics - GSSI-SISSA joint lectures*”, <https://indico.gssi.it/event/127/>, June–July 2020.
- 2020 “*Applications of Bogoliubov Theory, Mathematical Physics of Quantum Many-Body Systems - Online Summer School*”, <http://nielsbenedikter.de/conference/conference.html>, 19–22 June 2020.



- 2020 “*Munich-Aarhus-Santiago Seminar in Mathematical Physics*”, <https://math.au.dk/en/projects/sqm/mas-mp-seminar/>, April-June 2020.
- 2019 “*From semi-classical to quantum many body through normal forms*”, workshop at Dipartimento di Matematica, Università degli Studi di Milano, 17-20 December 2019.
- 2019 “*Meccanica quantistica e dintorni*”, workshop at “Sapienza” Università di Roma, 7–8 November 2019.
- 2019 “*Quantum graphs and quantum random walks*”, Lake Como School of Advanced Studies at Villa del Grumello, Como, 5–9 August 2019.
- 2019 “*Foundations and Constructive Aspects of QFT*”, 43rd workshop of the LQP series at Galileo Galilei Institute, Firenze, 20–22 February 2019.
- 2018 “*Mathematical Challenges of Zero Range Physics: rigorous results and open problems*”, INdAM workshop at “Sapienza” Università di Roma, 9–13 July 2018.
- 2018 “*Trails in Quantum Mechanics and Surroundings*”, workshop at SISSA Trieste, 29–30 January 2018.
- 2017 “*Spectral and scattering theory: from selfadjoint operators to boundary value problems - Insubria Summer School in Mathematical Physics*”, workshop at Department of Science, Università degli Studi dell’Insubria (Como), 18–22 September 2017.
- 2017 “*Fundamental problems of quantum physics*”, workshop INFN BELL 2017 at Dipartimento di Fisica, Università degli Studi di Milano, 16 June 2017.
- 2017 “*Linear and Nonlinear Dirac Equation: advances and open problems*”, workshop at Dipartimento di Scienza e Alta Tecnologia, Università degli Studi dell’Insubria (Como), 08–10 February 2017.
- 2016 “*EMS – IAMP Summer School in Mathematical Physics. Universality, Scaling Limits and Effective Theories*”, “Sapienza” Università di Roma, 11–15 July 2016.
- 2016 “*Contemporary Trends in the Mathematics of Quantum Mechanics*”, INdAM workshop at “Sapienza” Università di Roma, 04–08 July 2016.
- 2016 “*Operator Algebras and Quantum Field Theory*”, workshop at Frascati INFN-LNF, 27–29 June 2016.
- 2016 “*Mathematical Challenges in Quantum Mechanics*”, workshop at Bressanone, 8–13 February 2016.
- 2016 “*Geometric and Analytic Theory of Hamiltonian Systems in Finite and Infinite Dimensions*”, workshop at SISSA (Trieste), 18–21 January 2016.
- 2015 “*Assemblea Scientifica GNFM*”, workshop at Montecatini, 22–24 October 2015.
- 2015 “*New Trends in Algebraic Quantum Field Theory (AQFT2015)*”, workshop at Frascati INFN-LNF, 11–13 February 2015.
- 2014 “*Operator and Geometric Analysis on Quantum Theory*”, workshop at Levico Terme (Trento), 15–19 September 2014.
- 2014 “*Algebraic Quantum Field Theory: its status and its future*”, workshop at ESI Wien, 19–23 May 2014.
- 2013 “*Finite and Infinite Dimensional Hamiltonian Systems*”, workshop at Dipartimento di Matematica, Università di Roma Tre, 24–25 October 2013.
- 2013 “*Recent Advances in Partial Differential Equations and Applications*”, International School at Dipartimento di Matematica, Università degli studi di Milano, 17–21 June 2013.
- 2013 “*Analytical Aspects of Mathematical Physics*”, workshop at ETH Zürich, 27–31 May 2013.
- 2012 “*La geometria degli atomi e delle molecole. La Meccanica negli studi di Carlo Cercignani*”, workshop at Istituto Lombardo, Accademia di Scienze e Lettere, 22 November 2012.

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