

Nicolò Defenu – Curriculum Vitae

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Education

- 11/2010** BSc with honors - Sapienza University of Rome, Roma
110/110 cum laude - 28/30 Average
Third Year Project - Second Quantization with application to phonon propagation.
Advisor: M. Testa
- 10/2012** MSc with honors - Sapienza University of Rome, Roma
110/110 cum laude - 29/30 Average
Final Year Project - Overhauser method for pair correlation function calculation applied to density functional theory.
Advisor: J. Lorenzana
- 01/2017** PhD with honors - International School for Advanced Studies (SISSA), Trieste
PhD cum laude (Maximum degree in the Italian System)
PhD Thesis - Application of Functional Renormalization Group Approach to spin systems and long range models.
Advisors: S. Ruffo, A. Trombettoni and A. Codello

Past Positions

- Dec 2016** Institute for Theoretical Physics (ITP), Philosophenweg, 19 - 69120 Heidelberg, Germany
Four years Post-Doc position in the group of Dr. Tilman Enss and member of the ISOQUANT collaboration

Present Position

- March 2020** Institute for Theoretical Physics, ETH Zürich, Wolfgang-Pauli-Str. 27, 8093, Zürich, Switzerland
Two years Post-Doc position in the group of Prof. Dr. Gian Michele Graf

Awards, Fellowships and Projects

- **Percorsi di eccellenza**
2010-Awarded of the merit-based fellowship *Percorsi di eccellenza*.
- **Percorso Imprenditoriale Re-Seed**
2014-Awarded of a project-based fellowship to fund a one year business management course.
- **Fellowship for EU collaborations**
2015-Awarded of the merit-based *Job Placement* fellowship to fund a two months visit at the Ruprecht-Karls-Universität in Heidelberg.

- **Individual research fellow**

2019-Individual research fellow of the Young Investigator Training Program: “Functional Renormalization Group Methods in Quantum and Statistical Physics”

- **Exploratory project within Structures Excellence Cluster**

2019-Leading investigator of the exploratory project “Universality on network structures” within the Structures Excellence Cluster at the University of Heidelberg.

- **Exploratory project within Structures Excellence Cluster**

2021-Coleading investigator of the exploratory project “Critical behavior of epidemic models on distinct network topologies and applications to the study of brain disease” within the Structures Excellence Cluster at the University of Heidelberg.

Organization of conferences

- **1st Workshop on Low Dimensional Quantum Many Body Systems**

Internationales Wissenschaftsforum Heidelberg (IWH), Germany.

Memberships

- **Member of the SwissMAP collaboration.**

- **External Member of the Structures Excellence Cluster at the University of Heidelberg.**

- **External Member of the CNR Istituto officina dei materiali (Trieste).**

- **External Member of SISSA (Trieste).**

Memberships in boards

- **Member of the Young Researchers Board in the Structures Excellence Cluster Feb. 2019**

The young researchers board proposes and organises scientific activities financed by the special fund for young researchers of the Structures Excellence Cluster. The board assigns travel stipends and internships, organises colloquia and invites scientific guests.

Research interests

- **Cold Atoms Physics**
- **Long range interactions**
- **Quantum Information**

Teaching experience

During my present employment at Heidelberg University it is part of my duties to participate at teaching activities. As a teaching assistant I have to correct and grade home exercise done by the students and to display the solution of such exercises in a lecture every week. Moreover, I have been a guest Instructor at SISSA (Trieste) where I was responsible for a one week intense course (4 ours per day) on Functional Renormalization Group.

- **Teaching Assistant for Advanced Condensed Matter Theory Feb.-Jul. 2017**

Heidelberg University, Instructor Prof. Maurits Havenkort

- **Teaching Assistant for Condensed Matter Theory Oct. 2017- Feb. 2018**

Heidelberg University, Instructor Prof. Maurits Havenkort

- **Teaching Assistant for Seminar on Statistical Physics** **Feb. - Jul. 2018**
Heidelberg University, Instructor Prof. Andreas Mielke
- **Teaching Assistant for Theoretical Statistical Physics** **Oct. 2018 - Feb. 2019**
Heidelberg University, Instructor Prof. Bjoern Malte Schaefer
- **Teaching Assistant for Seminar on Nonlinear Systems** **Mar. - Jul. 2019**
Heidelberg University, Instructor Prof. Andreas Mielke
- **Main Instructor for Functional Renormalization Group** **Jun. 2019**
SISSA (Trieste), Co-Instructor Dr. Andrea Trombettoni
- **Head Teaching Assistant (Oberassistent) for Theoretical Statistical Physics** **Oct. 2019- Oct. 2020**
Heidelberg University, Instructor Prof. Luca Amendola
- **Main Instructor for Functional Renormalization Group** **Apr. 2020**
SISSA (Trieste), Co-Instructor Dr. Andrea Trombettoni
- **Teaching Assistant for the master proseminar on Renormalization Group** **Oct.-Dec. 2020**
ETH Zurich, main Instructor Dr. Ramasubramanian Citra
- **Teaching Assistant for the bachelor proseminar on Field theory and Classical physics** **Jan.-Jun. 2021**
ETH Zurich, main Instructor Prof. Gian Michele Graf
- **Master thesis advisor** **Dec. 2020**
Title: "Dynamical Quantum Phase Transitions in the Spherical Model"
Candidate: Marvin Syed
- **Master thesis advisor** **Oct. 2020**
Title: "Renormalization group approach to the calculation of integrals"
Candidate: Alberto Catalano
- **Master thesis advisor** **Sept. 2021**
Title: "Quantum Criticality and the Spherical Model on a Graph"
Candidate: Pascal Schweizer
- **Master thesis co-advisor** **July 2021**
Title: "A functional RG approach to PT-symmetric models"
Candidate: Benjamin Liégeois
- **PhD thesis co-advisor** **Ongoing**
Title: "Statistical mechanics of long-range interacting systems"
Candidate: Guido Giachetti
Local Advisor: Prof. Stefano Ruffo

Referee experience

- Referee for *Phys. Rev. Lett.* **multiple times since Feb. 2019**

- Referee for *New J. Phys.* **Sep. 2019**

- Referee for *Phys. Rev. A* **Nov. 2019**

- Referee for *Eur. J. Phys. C* **Feb. 2020**

- Referee for *Phys. Rev. E* **multiple times since Sep. 2020**

- Referee for *Phys. Rev. B* **multiple times since Dec. 2020**

- Referee for *Nucl. Phys. B* **July 2021**

- Referee for *Sci. Post.* **June 2021**

Activities

▪ Invited Speakers

- *Conference on Long-Range-Interacting Many Body Systems: from Atomic to Astrophysical Scales*, 25th–29th July 2016, Trieste. Invited Speaker.
- *CQD mini symposium*, April 19th–20th, 2017, Physikalisches Institut, Heidelberg. Invited Speaker.
- *Stochastic Dynamics Out of Equilibrium: Young researchers' seminar*, 24th–05th April-May 2017, Institute Henri Poincare, Paris. Invited Speaker.
- *Quantum Many-Body Systems out-of-equilibrium*, 12th–16th March 2018, NITheP, Stellenbosch, South Africa. Invited Speaker.
- *Quantum Paths*, 28th–1st May-June 2018, Erwin Schrödinger International Institute for Mathematics and Physics (ESI), Vienna. Invited Speaker.
- *EXPLORING NUCLEAR PHYSICS WITH ULTRACOLD ATOMS*, 8th–12th July 2019, ECT*, Trento. Invited Speaker.
- *QUANTUM AND CLASSICAL SYSTEMS WITH LONG-RANGE INTERACTIONS*, 15th–19th July 2019, International Institute of Physics, IIP (Natal). Invited Speaker.
- *Functional Renormalization Group methods-Italian Meeting*, 16th–20th Sept. 2019, ECT*, Trento, Italy. Invited Speaker.
- *FRGIM@Trieste*, 26th Sept. 2019, SISSA, Trieste, Italy. Invited Speaker.
- *Exact Renormalization Group 2020*, 2th–6th November 2020, Yukawa Institute for Theoretical Physics, Kyoto University. Invited Speaker.
- *SISSA long-range workshop*, 18th November 2020, SISSA, Trieste, Italy. Invited Speaker.

- *Non-Equilibrium Universality: From Classical to Quantum and Back*,
13th-September to 8th-October, 2021, Kavli Institute for Theoretical Physics, UC Santa Barbara. Invited Speaker.

■ Selected Scientific Visits

- *MTA Atomki, Hungarian Academy of science*, Debrecen.
Repeated visits starting from December 2014. Seminar Presentation.
- *International Institute of Physics*, Natal (Brasil),
1-7 December 2013, Natal. Seminar Presentation.
- *Theoretical Quantum Physics Group*, Universitaat des Saarlandes,
Repeated visits starting from February 2016.
- *La Sapienza University*, Rome,
Repeated visits starting from March 2016. Seminar Presentation.
- *International School for Advanced Studies, SISSA*, Trieste,
Repeated visits starting from January 2017. Seminar Presentation.
- *ETH*, Zürich,
02nd–04th October 2017, Zürich. Seminar Presentation.
- *University of Colorado, Boulder, JILA*,
09th–12th October 2017, Boulder. Seminar Presentation.
- *Los Alamos National Laboratory, LANL*,
13th–25th October 2017, Los Alamos. Seminar Presentation.
- *Boston University, BU*,
3rd–17th May 2018, Boston.
- *Weizmann Institute of Science*,
Rehovot, Israel. Repeated visits starting from November 2018. Seminar Presentation.
- *Massachusetts Institute of Technology, MIT*,
22th–30th April 2019, Boston, USA.
- *Simons Center for Geometry and Physics, SCGP*,
1st–2nd May 2019, Stony Brook, USA. Seminar Presentation.
- *Georgetown University, GU*,
3rd–6th May 2019, Washington, USA. Invited Seminar.
- *Swinburne University of Technology, SUT*,
20th–24th January 2020, Melbourne, Australia. Seminar Presentation.

Numerical Skills

■ Operative Systems

Windows
OSX
Linux-Ubuntu, Lubuntu, Linux Mint, OpenSUSE.

■ Text Editing

LaTeX
Microsoft Office™
Open Office

■ Programming Languages

Python - Numpy, Sympy, Scipy, Pandas
C, C++
PHP

- **Scientific Programs**

Wolfram *Mathematica*®

Matlab

Gnuplot

Origin

- **Web Development**

Webmaster of Condensed Matter Department at SISSA

Languages

- **Italian - Native**

- **English - Excellent**

- **German - Basic**