



MAX-PLANCK-GESELLSCHAFT

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Scientist



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Profile

I am a scientist in the theory division of the Max Planck Institute for the Physics of Light.

Education

PhD in Physics, Heinrich Heine Universität, Düsseldorf, Germany, magna cum laude in 2006.

MSc in Physics, Università degli Studi, Milano, Italy, 110/110 cum laude in 2001.

Experience

2018— Max Planck Institute for the Science of Light, Erlangen, Germany.

Senior Scientist in the theory division (tenured position).

2016-2018 University of Malta, Msida, Malta.

Lecturer at the department of Physics (tenured position).

2012-2016 Friedrich-Alexander-University, Erlangen, Germany.

Postdoc in the group of Florian Marquardt.

2011-2012 Michigan State University, East Lansing, USA.

Postdoc in the group of Mark Dykman.

2009-2011 Freiburg Institute of technology, Freiburg, Germany.

Postdoc in the group of Michael Thorwart.

2008-2009 Heinrich Heine University, Düsseldorf, Germany,

Postdoc in the group of Reinhold Egger.

2003-2006 Heinrich Heine University, Düsseldorf, Germany, 2003-2006.

PhD student in the group of Reinhold Egger.

Research

My research lies at the interface between quantum optics and nanophysics and has both fundamental and applied directions. On the more fundamental side, I try to understand robust physical phenomena by identifying and studying the simplest possible toy models that capture them. On the applied side of thing, I aim to engineer useful phononic and photonic devices. In both endeavours, I make use of both analytical and numerical tools. Recurring themes in my research include quantum-limited measurements and amplification, heating and activation induced by quantum fluctuations out-of-equilibrium, topologically protected transport, symmetry-based band structure engineering. Highlights from my research include providing the first proposal for topologically protected transport of vibrations in the solid state (arXiv Sep 14, Prx 2015) and the first proposal of an active topological device, a topological quantum-limited amplifier (arXiv April 2016, PRX 2016).

Publications

I have published 26 articles in peer-reviewed journals; these include 2 in Phys. Rev. X, 1 in Nature Communications, 1 in Proc. Natl. Acad. Sci. U.S.A and 3 in Phys. Rev. Lett. Moreover, I am an inventor in a Us-patent application filled by the University of Erlangen (for the topological amplifier). A variety of statistics related to my publications is available through my public [google scholar profile](#). According to google scholar, I have been cited more than 900 times (more than 200 of which in 2018 only), my Hirsch- and my i-10 indexes are both 18.

Selected Publications

- *Pseudomagnetic fields for sound at the nanoscale*. C. Brendel, V. Peano, O. Painter, and F. Marquardt; PNAS 2017 **114** (17) E3390-E3395 (2017).
- *Topological quantum fluctuations and travelling wave amplifiers*. V. Peano, M. Houde, F. Marquardt, and A. Clerk; Phys. Rev. X **6**, 041026 (2016).
- *Topological phase transitions and chiral inelastic transport induced by the squeezing of light*. V. Peano, M. Houde, C. Brendel, F. Marquardt, and A. A. Clerk; Nature Communication **7**, 10779 (2016).

- *Topological Phases of Sound and Light*. V. Peano, C. Brendel, M. Schmidt, F. Marquardt; Phys. Rev. X **5**, 031011 (2015). [Also highlighted in Nature Photonics; Nature Photonics 9 631 (2015).]
- *Optomechanical creation of magnetic fields for photons on a lattice*. Schmidt, S. Keßler, V. Peano, O. Painter, F. Marquardt; Optica **2** 635 (2015). [Also highlighted in Nature Photonics; Nature Photonics 9 553 (2015).]
- *Sharp tunneling peaks in a parametric oscillator: quantum resonances missing in the rotating wave approximation*. V. Peano, M. Marthaler, and M. I. Dykman; Phys. Rev. Lett. **109**, 090401 (2012)
- *Quantum heating of a parametrically modulated oscillator: spectral signatures*. M. I. Dykman, M. Marthaler, and V. Peano; Phys. Rev. A **83**, 052115 (2011)
- *Confinement-induced resonances for a two-component ultracold atom gas in arbitrary quasi-one-dimensional traps*. V. Peano, M. Thorwart, C. Mora, and R. Egger; New J. Phys. **7**, 192 (2005)

Peer review

I am a referee for Nature, Nature Communications, Scientific Reports, Physical Review X, Physical Review Letters, Physical Review Applied, Physical Review A, Physical Review B, and New Journal of Physics.

Languages

Italian, English, German, Spanish, a bit of Portuguese, and I am learning Russian from my kids.

Outreach

In my time in Malta I have collaborated with the Times of Malta to disseminate science to a broad audience on the island, see [here](#).

Recent Invited talks

- **September 2017**, Workshop: *Foundations and Applications of Nanomechanics*, Trieste (IT)
- **July 2017**, Summer school: *Quantum Measurements and Theoretical Cavity Optomechanics* within the OMT (Optomechanical technologies) Marie-Curie training network, Erlangen (DE).
- **January 2017**, Aspen center for physics, winter conference 2017: *Topological metamaterials and beyond*, Aspen (USA)
- **July 2016**, Seminar at the ETH Zürich (AG Huber), Zürich (CH)
- **June 2016**, Seminar at the Technische Universität Berlin (AG Brandes), Berlin (DE)
- **March 2016**, Gordon Research Conference: *Mechanical Quantum Systems: From Fundamental Physics to Real World Applications*, Ventura (USA)
- **July 2015**, Conference: *Frontiers of Quantum and Mesoscopic Thermodynamics*, Prague (CZ)
- **July 2015**, Seminar at ICFO, Barcelona (ES)
- **June 2015**, Colloquium of the Sonderforschungsbereich 668: *Magnetismus vom Einzelatom zur Nanostruktur*, Hamburg, (DE)
- **June 2015**, Workshop: *Charge Transfer meets Circuit Quantum Electrodynamics*, Dresden (DE)
- **May 2015**, Workshop: *Quantum Phononics From Transport and Optomechanics to Quantum Biology*, Crete (GR)
- **March 2015**, Workshop: *Photons beyond qubits*, Olomouc (CZ)
- **March 2015**, Seminar at the Michigan State University, East Lansing (USA)
- **December 2014**, Workshop TopOslo: *Topological Phenomena in Low-dimensional Quantum System*, Oslo (NO)
- **November 2014**, Quantum Dynamics Seminar at the Max Planck Institute for Complex Systems, Dresden (DE)
- **March 2014**, Seminar at NASA Ames Research Center, Mountain View (USA)