Matteo SECLÌ

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Computational Quantum Physicist

PROFESSIONAL EXPERIENCE

Ongoing – Jan 2022 | **Postdoctoral Researcher | UNIVERSITY OF CALIFORNIA, Berkeley (USA)**

- Advancing and developing new numerical software for the large-scale simulation of active photonic devices, with a focus on topological systems and photonic crystals.
- Developing novel nonlinear photonic devices for enhanced light transport and generation.

Jun 2019 – Nov 2018 | **ICT Research Consultant | ESTECO S.P.A., Trieste (Italy)**

- Technology transfer project "PHD4PMI" sponsored by SISSA, in team with other 4 PhD students.
- Developed a prototype software for Business Process Management (BPM) applications, leveraging my expertise in high-performance numerical simulations.

EDUCATION & TRAINING

Sep 2021 – Oct 2017 | **PhD in Theory and Numerical Simulation of Condensed Matter | with honors**

INTERNATIONAL SCHOOL FOR ADVANCED STUDIES (SISSA), TRIESTE (ITALY)

Dissertation: Topology and Nonlinearity in Driven-Dissipative Photonic Lattices: Semiclassical and Quantum Approaches

Supervisors: Massimo Capone (SISSA), Iacopo Carusotto (INO-CNR BEC Center), and Marco Schirò (Collège de France)

- Developed and computationally modeled new, topologically robust laser technology.
- Developed new high-performance computational technique for the quantum simulation of lattices of nonlinear optical cavities out of equilibrium (e.g. superconducting qubits).

Nov 2019 – Dec 2019: visiting PhD Student at Collège de France.

Oct 2017 – Aug 2015 | **Master's Degree in Theoretical and Computational Physics | with honors**

UNIVERSITY OF TRENTO, TRENTO (ITALY) & SISSA, TRIESTE (ITALY) | EXCELLENCE JOINT PROGRAMME

Dissertation: Edge State Lasing in a 2D Topological Photonic System

Supervisors: Iacopo Carusotto (INO-CNR BEC Center) and Massimo Capone (SISSA)

In addition to the Master's Degree, I was awarded a "Diploma in Physics" by SISSA.

Jul 2015 – Sep 2012 | **Bachelor's Degree in Physics | with honors**

UNIVERSITY OF TRENTO, TRENTO (ITALY)

Dissertation: Variational Monte Carlo methods for quantum dots

Supervisors: Morten Hjorth-Jensen (UiO) and Francesco Pederiva (UniTN)

Aug 2014 – Jun 2015: Erasmus+ Programme exchange student at the University of Oslo (UiO).

TECH SKILLS

Linux/Unix, Bash	●●●●●
C++, MATLAB	●●●●●
HPC, Git	●●●●○
LaTeX, Markdown	●●●●○
Python	●●●○○
Mathematica	●●○○○

SOCIAL COMMITMENT AND HOBBIES

- SISSA Club's Directive Board Member (2018–2020). I've organized non-profit language courses and extra students' activities.
- Students Representative for SISSA's Physics Area (2018–2021).
- I love playing piano and singing with other people. I join bands and choirs in the cities I move to.

LANGUAGE SKILLS

Italian (L1)	●●●●●
English (L2)	●●●●●

STRENGTHS

- Problem Solving
- Autonomous Research
- Passion
- Team Work

Honors & Awards

2020 **Premio di Merito (2019)**
University of Trento

Merit Prize as one of the best graduating students in 2017.

2018 **Premio per Tesi di Laurea in Fisica "Rotary Club Trentino Nord"**
Rotary Club Trentino Nord

Prize for the best Master Thesis in Physics "which tackles innovative problems and with application perspectives in the industrial field", funded by Rotary Club Trentino Nord.

2016 **Premio di Merito (2015)**
University of Trento

Merit Prize as one of the best graduating students in 2015.

Grants & Scholarships

Mar 2022 **CINECA award HP10CFGJ44 | HPC resources and support**
Jun 2021 CINECA

Grant of world-class high-performance computing resources under the ISCRA initiative.

Oct 2017 **Joint Programme UniTN-SISSA | Monthly scholarship covering lodging and daily expenses**
Oct 2015 University of Trento - SISSA

Highly selective joint MSc program. Requires to keep a high GPA, to attend PhD courses and to graduate within 2 academic years with at least 132 ECTS.

Jul 2015 **Collegio di Merito "Bernardo Clesio" | Free lodging in the University's Merit College**
Oct 2012 University of Trento

Merit College which requires to keep a high GPA, to score at least 58/60 ECTS per year and to attend extra lectures/seminars.

Select Publications

Journal Articles

1. Jia, Zhetao, Matteo Seclì, Alexander Avdoshkin, Walid Redjem, Elizabeth Dresselhaus, Joel Moore, and Boubacar Kanté (2023). "Disordered topological graphs enhancing nonlinear phenomena". In: *Science Advances* 9.14, eadf9330. DOI: 10.1126/sciadv.adf9330.

2. Seclì, Matteo, Massimo Capone, and Marco Schirò (2022). "Steady-state quantum Zeno effect of driven-dissipative bosons with dynamical mean-field theory". In: *Physical Review A* 106.1, p. 13707. DOI: 10.1103/PhysRevA.106.013707.

3. Loirette-Pelous, Aurelian, Ivan Amelio, Matteo Seclì, and Iacopo Carusotto (2021). "Linearized theory of the fluctuation dynamics in two-dimensional topological lasers". In: *Physical Review A* 104.5, p. 053516. DOI: 10.1103/PhysRevA.104.053516.

4. Seclì, Matteo, Massimo Capone, and Marco Schirò (2021). "Signatures of self-trapping in the driven-dissipative Bose–Hubbard dimer". In: *New Journal of Physics* 23.6, p. 063056. DOI: 10.1088/1367-2630/ac04c8.

5. Seclì, Matteo, Tomoki Ozawa, Massimo Capone, and Iacopo Carusotto (2021). "Spatial and spectral mode-selection effects in topological lasers with frequency-dependent gain". In: *APL Photonics* 6.5, p. 050803. DOI: 10.1063/5.0041124.

6. Seclì, Matteo, Massimo Capone, and Iacopo Carusotto (2019). "Theory of chiral edge state lasing in a two-dimensional topological system". In: *Physical Review Research* 1.3, p. 033148. DOI: 10.1103/PhysRevResearch.1.033148.