



# NICOLAS BAÙ

PHD STUDENT IN PHYSICS

## PERSONAL PROFILE

I am a determined student, curious, and willing to face new challenges. I am organized and I have good teamwork skills, developed thanks to the projects I participated in during my studies, like the development of a rover with the Arduino board in high school, and the laboratory group projects during University. I am passionate about software development.

## SKILLS

- Determined and well disciplined;
- Teamwork;
- Knowledge of programming languages: Python, Fortran, C++, HTML/CSS, SQL e Javascript (basic level);

## CONTACTS

nicolas.bau@phd.units.it  
Str. Costiera, 11, 34151 - Trieste (TS), Italy

## LANGUAGES

Italian, native speaker  
English, very good command, B2

## DRIVING LICENSE

AM, B

Developer of StraWBerryPy:  
<https://github.com/strawberrypy/developers/strawberrypy>



## EDUCATION

### University of Trieste (Italy)

Currently PhD student in Physics

My PhD research project is aimed to the computational design and characterization of topological superconductors via first-principles simulations. The project is supervised by Dr. Antimo Marrazzo.

### University of Trieste (Italy), SISSA, Collegio

Universitario Luciano Fonda

MSc in Condensed Matter Physics, 2023, 110/110 cum laude, student of the fast-track advanced training programme with the "Theory and Numerical Simulations of Condensed Matter" group at SISSA

Thesis title: "Local Z2 topological markers", supervised by Dr. Antimo Marrazzo (SISSA); I developed a method to compute the local topological invariant of quantum spin Hall insulators with open boundary conditions based on Wannier functions. Then, I introduced a local marker within periodic boundary conditions for the anomalous Hall insulators, and extended it to the aforementioned cases. Finally, I implemented a Python package to calculate local topological invariants in tight-binding models (StraWBerryPy).

### University of Trieste (Italy), Collegio

Universitario Luciano Fonda

BSc in Physics, 110/110 cum laude

Thesis title: "Simulations on classical and quantum computers of the Heisenberg model", supervisor Prof. Federico Becca (Università degli Studi di Trieste), co-supervisor: Dr. Juan Felipe Carrasquilla (Vector Institute for Artificial Intelligence, Canada);

## AWARDS

- Admitted to the merit-based "Fast-track advanced training programme in Physics towards PhD" in the "Theory and Numerical Simulations of Condensed Matter" group at SISSA;
- Best freshman award in the Physics Department at University of Trieste (Italy), academic year 2018/19;
- Awarded with a competitive and merit-based scholarship and admitted to the Collegio Universitario Luciano Fonda for both bachelor and master degree;

## SCHOOLS AND WORKSHOPS

- Poster session at "CMT@Brixen 2024", Bressanone (Italy), Ago 28 - 30, 2024
- Poster session at "European School on Superconductivity and Magnetism in Quantum Materials", Valencia (Spain), Apr 21 - 25, 2024
- Contributed talk at "87th Annual Conference of the DPG and DPG Spring Meeting", Berlin (Germany), Mar 17 - 22, 2024
- Poster session at "Workshop on Twistronics and Moiré Materials: Bridging Theory and Experiments", Trieste (Italy), Jan 16 - 19, 2024

## PUBLICATIONS

*Theory of local Z2 topological markers for finite and periodic systems*, N. Baù and A. Marrazzo, Phys. Rev. B **110**, 054203 (2024)

*Local Chern marker for Periodic Systems*, N. Baù and A. Marrazzo, Phys. Rev. B **109**, 014206 (2024)

*Come varia il flusso dei raggi cosmici con la quota? Basta chiederlo agli studenti del progetto EEE*, Giornale di Fisica (SIF), Vol XLII, N.2, Feb 2018