

Ph.D course in Theory and Numerical Simulation on the Condensed Matter

Head of the Ph.D course: Prof. Giuseppe Santoro

Web site: [Theory and Numerical Simulation on the Condensed Matter](#)

Research lines:

- Non-equilibrium dynamics of correlated systems
- Theoretical Quantum Technologies
- Methods for many-body quantum systems: Tensor Networks, DMFT
- Mott Physics and topology from solids to heterostructures
- High-temperature superconductivity and strong correlations
- Optical and excited-state properties of complex molecular systems
- Theory and simulation of thermal transport in liquid and amorphous systems
- Relativistic effects in materials
- Validation of pseudopotentials for high throughput applications
- Beyond DFT: RPA and WdWDF
- Electronic simulation of realistic systems by advanced many-body techniques
- Software engineering and the Quantum ESPRESSO project

Fellowships available: 6 financed by SISSA

1 co-financed by Leonardo SpA on *“Hybrid quantum and classical computation workflows for quantum machine learning”*

1 co-financed by Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA - France) on *“Development of theoretical and numerical tools to predict capture cross-sections and decay rates in non-radiative phenomena”*

Admission: Academic and scientific qualifications + oral exam (remotely)

Beginning of the Courses: 1st October, 2024

Evaluation of academic and scientific qualifications: 30 points

Access to Oral Exam: minimum mark of 21/30 on academic and scientific qualifications

Evaluation of Oral Exam: 70 points

To be considered eligible, candidates must pass all the phases (academic qualifications, written test, and interview) with a minimum mark of 7/10 or equivalent

Deadline for online submission of applications: 27th February, 2024

Oral Exam: 11th -15th March, 2024

All results and the final ranking will be notified by email.