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

Head of the Ph.D course: **Prof. Alessandro SILVA**
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
- Quantum Monte Carlo methods for lattice models and electronic systems
- Quantum algorithms for physics applications, sampling, optimization

Fellowships available: **7 funded by SISSA**
1 funded by FSE +
Admission: **Academic and scientific qualifications + oral exam (remotely)**
Beginning of the Courses: **1st October, 2026**

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 both phases (academic qualifications and interview) with a minimum mark of 7/10 or equivalent

Deadline for online submission of applications: 27th February, 2026

Oral Exam: **16th to 20th March, 2026**

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