

CNR-SPIN, Topological quantum platforms and materials

Wed, 2016-10-05 09:37 - [Mario Cuoco](#) [1] **Website:**
www.spin.cnr.it [2]

Research Type: Theory
Experiment

Topological quantum systems and materials

1. Physical properties of topological phases, characterization of topological phases and topological phase transitions
2. Geometric topology and topological phases in shape deformed nanostructures (semiconductors and superconductors)
3. Topological phases in superconductor-semiconductor nanostructures
4. Manipulating topological states in hybrids based on chiral and helical topological superconductors
5. Adiabatic quantum computation in the presence of a phonon decoherence bath
6. Control of energy exchanges of topological systems; characterization and measurement of work and heat in quantum systems
7. Geometric (Abelian) and holonomic (non-Abelian) quantum computation, implementation of holonomic quantum computation in semiconductor and superconducting systems
8. Robustness of topological order under local perturbations and inhomogeneities
9. Materials design for novel topological systems, ab-initio electronic structure of topological systems
10. Synthesis and analysis of topological superconductors (chiral and helical)
11. Synthesis and characterization of interfaces (mainly transition metal oxides) for the design of topological phase
12. Analytical and numerical computing approaches for topological phases in correlated electrons in the presence of strong spin-orbit coupling

Leader: Mario Cuoco

Location

CNR-SPIN Salerno Via G. Paolo II, 132
Fisciano 84084 Italy
40° 46' 23.4984" N, 14° 47' 47.6196" E

- [Quantum Control](#) [3]
- [Quantum Engineering](#) [4]

- [Quantum Computation](#) [5]
- [Quantum Simulation](#) [6]

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