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Organization details

Center for Quantum Information Science and Technology

& Quantum Computing Center

USC/Information Sciences Institute

- Lead Investigators:
  Daniel Lidar, Federico Spedalieri and Itay Hen
- Team members:
  - Faculty: Paolo Zanardi, Lorenzo Campos-Venuti, Greg Ver Steeg
  - Research Scientists: Tameem Albash
  - Postdoc: Walter Vinci
  - Grad students: Joshua Job, Richard Li, Anurag Mishra, Jeff Marshall, Neil Mehta, Zoe Gonzalez-Izquierdo

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Research areas of expertise

- **Theoretical adiabatic quantum computing (AQC):** quantum algorithms, adiabatic theorems, error correction, open quantum systems, entanglement witnesses.
- **Computational physics and numerical methods**: modeling and simulations of quantum and classical annealers, Monte Carlo, optimization techniques.
- **Years of experience studying the D-Wave processors**: fundamental characteristics and limitations and benchmarking of experimental quantum annealing optimizers.

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Unique qualifications and capabilities

- Expertise in error correction for quantum annealing optimizers.
- Embedding of practical problems: solving large problems, decomposition, graph minor embedding, constrained optimization.
- Methods for characterizing experimental quantum annealers (experience studying the D-Wave processors since 2011).
- Characterization of experimental devices: quantum signatures, QA susceptibility to classical "showstoppers", entanglement witnesses.
- Architectures for future optimizers: characteristics and limitations.
- Novel methods for benchmarking. Quantum vs classical energy landscapes, search for classically hard/quantum easy problems.
- Quantum enhancements "beyond speedup": annealers as samplers…
- Simulation and modeling of quantum and classical heuristic optimizers.

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Seeking collaboration

- Contribute to the QEO effort in our areas of expertise.
- Collaborate with experimentalists, specifically groups that build qubits and/or whole chips.
- Team up to learn about technical/practical hurdles.
- Join forces to develop novel approaches to advance the QEO state of the art.

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Contact Information

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