

PhD Course on Quantum Computing

a.y. 2018/2019

Dario Gerace (UniPV)

Universal quantum simulators

15, 16 and 22 January 2019, 10:00-12:00

Basis of digital quantum simulation: from physical models to the quantum circuit representation to be encoded on a quantum processor. Time evolution through the Suzuki-Trotter decomposition. Examples of quantum coding: quantum circuit representation of the Heisenberg and Ising models. Brief overview of existing quantum processors on different platforms: trapped ions, superconducting qubits, quantum dots. A selection of prospective technologies to realise hybrid quantum simulators: hybrid spin-photon qubits, magnetic molecules, electromechanical devices.

I. Tavernelli (IBM, Zürich) - Superconducting qubits (*lecture, 8 hours*)

- 12-13 February 2019, 10:00-12:00 and 15:00-17:00

D. Bajoni (UniPV) - Photonic quantum simulators (*seminar, 2 hours*)

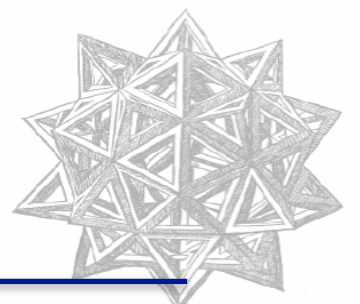
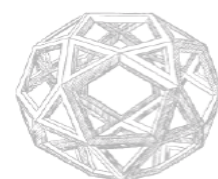
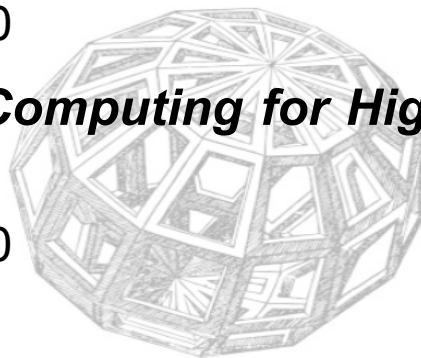
- 23 January 2019, 10:00-12:00

J. I. Latorre (Barcelona) - Hybrid quantum algorithms (*seminar, 2 hours*)

- 14 February 2019, 10:00-12:00

F. Carminati (CERN) - Quantum Computing for High Energy Physics Applications (*seminar, 2 hours*)

- 21 February 2019, 10:00-12:00



Lectures will be given in A101 of the Physics Department, Via Bassi 6, Pavia

For further details, please visit the website <http://fisica.unipv.it/dottorato/corso-quantum-computing.htm> and contact the course responsible (daniela.rebuzzi@unipv.it) or the PhD Coordinator (lucio.andreani@unipv.it).



UNIVERSITA' DEGLI STUDI DI PAVIA

DOTTORATO DI RICERCA IN FISICA

PhD Course on Quantum Computing

a.y. 2018/2019

Daniele Bajoni (UniPV)

Photonic quantum simulators

23 January 2019, 10:00-12:00

Brief overview of photonics platforms, with focus on integrated photonics. Different types of qubit implementations using photons: polarization, time-bin, and dual rail encoding. Quantum gates and basic algorithms in photonic platforms, photonic simulators. The problem of scaling the number of qubits and possible solutions.

I. Tavernelli (IBM, Zürich) - Superconducting qubits *(lecture, 8 hours)*

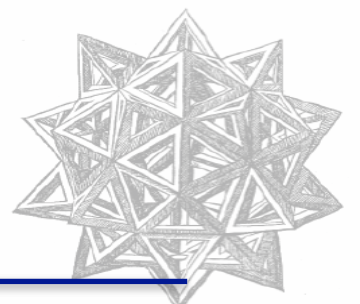
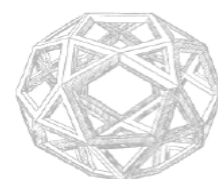
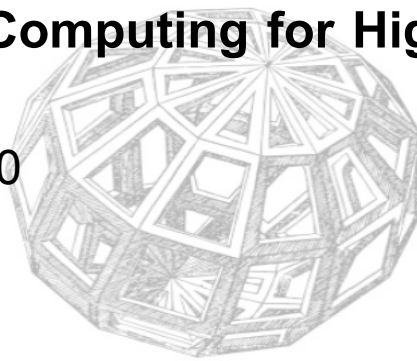
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