

Invitation to IQST Seminar

on Thursday, February 22nd, 2018, 11am
Ulm University
N25, Room 4413
Albert-Einstein-Allee 11



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TITLE

Digital quantum simulators in superconducting-based hybrid platforms

ABSTRACT

Quantum simulators are among the most exciting applications of prospective quantum computers. In particular, digital quantum simulation in principle allows to solve for the dynamical evolution of any Hamiltonian that can be represented as a sum of local terms and mapped onto a spin-type model. Thus, realizing a universal quantum computer practically implies the prospective solution of several manybody problems that would otherwise be untractable with classical computers. Here I will review a few recent approaches proposing the realization of digital quantum simulators in hybrid systems based on superconducting platforms. In particular, I will first focus on simulators relying on hybrid spin-photon qubits [1,2], in which spin-ensembles are coupled to microwave photons in superconducting resonators, allowing to define a dual-rail encoding taking the best of two worlds. Then, I will introduce and describe the possibility of exploiting vibrational degrees of freedom in electromechanical devices as a viable route to universal and scalable quantum computing [3].

[1] S. Carretta et al., Phys. Rev. Lett. 111, 110501 (2013);

[2] A. Chiesa et al., Sci. Rep. 5, 16036 (2015);

[3] F. Tacchino et al., arxiv:1711.00051 (2017).

Host: Prof. Dr. Simone Montangero, Institute for Complex Quantum Systems, Ulm University