PAUL SCHERRER INSTITUT

Friday, August 28, 2020, 11:15 h, for 50 registered attendees at WHGA/001*
and via zoom
https://psich.zoom.us/j/94792870090

* register by email simon.gerber@psi.ch

PSI Colloquium

Prof. Andreas Wallraff,
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Building Superconducting Quantum Processors: State of the Art and Challenges

Abstract

Superconducting circuits are ideally suited for studying quantum phenomena at the macroscopic scale. Since mid-complexity circuits, containing a few tens to a few hundreds of elements, can be designed, fabricated, and operated with relative ease using present day technology, they are one of the prime contenders for realizing quantum computers. Using superconducting circuits academic and industrial labs aim at both addressing noisy intermediate-scale quantum (NISQ) problems and realizing universal quantum computation in fault-tolerant processors. Realizing large scale integrated circuits, which can address commercially relevant computational problems, however, still requires significant conceptual and technological progress. In this talk, I will introduce the quantum physics of superconducting circuits [1] which underlies the hardware used in superconducting quantum processors. As an example of our current research, I will then discuss our experimental efforts [2] towards realizing quantum error correction in superconducting circuits, which is an essential ingredient for reaching the full potential of fault-tolerant universal quantum computation. Finally, I will discuss the challenges on the route toward large-scale quantum processors based on superconducting circuits.

References
[1] A. Blais et al., arXiv:2005.12667 (2020)
[2] C. K. Andersen et al., Nature Physics 16, 875–880 (2020)

COFFEE BEFORE THE COLLOQUIUM FOR REGISTERED ATTENDEES

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