

Physikalisches Kolloquium



Thursday, 03.05.2018, 16:15, HS 100
Reception with coffee & cookies 15:45
 (For university staff: please bring your own cup for sustainability reasons)

Prof. Dr. Frank Wilhelm-Mauch, Universität des Saarlandes:

Optimal control for scalable quantum computers

Abstract

Long considered a far-off vision, quantum computing is now becoming a reality. Small but nontrivial quantum computers of up to 19 quantum bits (qubits) are offered as a cloud service and announcements of near-term chips reach up to 72 qubits. These processors are almost all based on the Josephson qubit platform.

Reaching true quantum advantage in these Noisy Intermediate Scale Quantum (NISQ) devices requires the executable quantum volume (a product of number of qubits, gate quality, and processor connectivity) large enough. Gate quality is currently equally limited by decoherence and control errors, both of which can be fought with optimal control.

Optimal control solutions for these challenges have to be effective, simple, and need to account for both spurious degrees of freedom and model uncertainty. This can be accomplished by simple recipes like DRAG and WAHWAH as well as by optimal control with integrated tuneup. To achieve high precision in this domain, effective characterization is an intricate part of the control procedure.

The colloquium talk will describe all these issues, including the speaker's contributions to it.

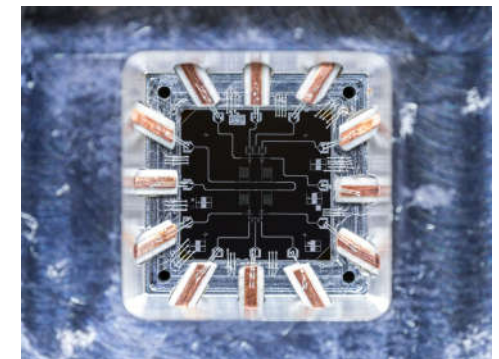


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All of you interested in physics are cordially invited!