



Physical Sciences Seminar

Multiplexed readout of four qubits in 3D circuit QED architecture using a broadband Josephson Parametric Amplifier

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Host: Johannes Fink

Superconducting quantum circuits are currently considered to be the most promising architecture for building practical quantum computers. However, efficient control and measurement of multiple qubits is an important challenge to build scalable superconducting quantum processors. Frequency multiplexed measurement is one technique to enable efficient use of resources and has been demonstrated in planar (2D) quantum circuits. In this talk, I will describe a frequency-multiplexed readout scheme in 3D cQED architecture to readout four transmon qubits. I will present high fidelity (~ 98%) single-shot simultaneous readout of multiple qubits achieved using an impedance engineered broadband Josephson parametric amplifier (JPA). I will also present data demonstrating simultaneous measurement of Rabi oscillations and quantum trajectories. I will then describe how this technique can be adapted to readout tens of qubits and conclude by discussing the consequent challenges in multiplexer design and enhancing broadband JPA performance.

Monday, May 6, 2019 10:00am - 11:00am

IST Austria Campus Big Seminar room Ground floor / Office Bldg West (I21.EG.101)



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