



PHYSICS AND ASTRONOMY COLLOQUIUM

Dr. Mikko Möttönen

Aalto University, Finland

“Quantum Reservoir Engineering for Electric Quantum Circuits”

Abstract

I focus on our recent development of engineered dissipation for quantum-mechanically behaving superconducting circuits at QCD Labs. In this context, I present our recent results on quantum-limited heat conduction over macroscopic distances [1] and on the quantum circuit refrigerator [2]. In the future, we aim to develop these concepts further into in-situ-tunable components that can be used to conveniently cool down electric quantum devices at will, although not hindering their coherent operation when desired. Such components can potentially be applied in the initialization of quantum registers in a gate-based quantum computer and in the enhancement of quantum annealers. Finally, I introduce a thermal detector for propagating microwave photons and demonstrate that it achieves an energy resolution of a single zeptojoule using electrothermal feedback [3]. To our knowledge, this is an order-of-magnitude improvement over previous thermal detectors, paving the way for high-fidelity single-photon microwave detectors.

Wednesday, September 14, 2016

3:00 p.m.

Elliott Building

Room 167