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## PROF. ANDREAS WALLRAFF ETH Zürich A Quantum Mechanics Lab on a Chip

Quantum mechanics is usually associated with the physics of microscopic objects such as atoms or photons. In this lecture, however, I will discuss the great opportunities that macroscopic superconducting electronic circuits have to offer to explore fundamental concepts of quantum physics in exquisite detail. For this purpose we use modern micro and nano-fabrication techniques combined with superconducting materials to realize quantum electronic circuits. In integrated circuits we create, store, and manipulate microwave photons one by

one. The strong coherent interaction of individual photons with superconducting quantum two-level systems allows us to probe fundamental quantum effects of radiation and also to develop devices for applications in quantum information technology. The enormous progress during the last decade has enabled us, for example, to create the most sensitive detectors of microwave frequency radiation, limited only by the laws of quantum physics, and also to make progress towards building a quantum computer.

