

Circuit quantum electrodynamics

Superconducting circuit QED is a research field that mimics Quantum Optics using microwaves and superconducting circuits to emulate light and quantum matter. In this lecture I will introduce the field, starting from the effective theories that we use to describe these systems and progressing to the most recent experiments and proposals in Quantum Information and Quantum Simulation. Recommended reading includes Refs. [1,2] and some introductory texts on the fundamentals of Quantum Optics.

[1] *Quantum fluctuations in electrical circuits*. Devoret M.H., in *Quantum Fluctuations / Les Houches*. (Elsevier, Amsterdam, Netherlands, 1997) p. 351-86
http://qulab.eng.yale.edu/documents/reprints/Houches_fluctuations.pdf

[2] *Wiring up quantum systems*, R. J. Schoelkopf, S. M. Girvin, *Nature* 451, 664-669 (2008)
<http://www.qudev.ethz.ch/content/courses/QSIT09/pdfs/Schoelkopf2008.pdf>