Photon condensation in circuit QED by engineered dissipation

Tue, 2013-05-07 13:34 - Mattia Giardini [1] **Date:** 2012-05-01
Author(s):
D. Marcos, A. Tomadin, S. Diehl, P. Rabl

Reference:
New J. Phys. 14 055005
doi:10.1088/1367-2630/14/5/055005

URL:
http://iopscience.iop.org/1367-2630/14/5/055005 [2]

We study photon condensation phenomena in a driven and dissipative array of superconducting microwave resonators. Specifically, we show that by using an appropriately designed coupling of microwave photons to superconducting qubits, an effective dissipative mechanism can be engineered, which scatters photons towards low-momentum states while conserving their number. This mimics a tunable coupling of bosons to a low-temperature bath, and leads to the formation of a stationary photon condensate in the presence of losses and under continuous-driving conditions. In this paper, we propose a realistic experimental setup to observe this effect in two or multiple coupled cavities, and study the characteristics of such an out-of-equilibrium condensate, which arise from the competition between pumping and dissipation processes.

- AQUTE [3]
- Result [4]
- 18.80.+d Quantum dissipative systems [5]
- 16.20.Sq Superconducting qubits coupled to resonators [6]

Source URL:
http://qurope.eu/db/publications/photon-condensation-circuit-qed-engineered-dissipation

Links:
[1] http://qurope.eu/users/giardini
[2] http://iopscience.iop.org/1367-2630/14/5/055005
[3] http://qurope.eu/category/projects/ips/aqute
[4] http://qurope.eu/category/attribute/result
[5] http://qurope.eu/category/qics/10-quantum-computation/18-decoherence-studies/1880d-quantum-dissipative-systems
[6] http://qurope.eu/category/qics/10-quantum-computation/16-implementations-condensed-matter/1620sq-superconducting-qubi