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Casimir-Polder-like Effect in a Superconducting Circuit System
PETER GROSZKOWSKI, EDUARDO MARTIN-MARTINEZ, CHRIS WILSON, Univ of Waterloo, FRANK WILHELM, Saarland University — Casimir-type forces arise when the ground state energy of a quantum field depends on a classically-treated degree of freedom. The first example of such forces was proposed by Casimir, when he considered the attractive force that arises between two neutral, conducting plates placed in a vacuum. In this talk, we will discuss a variation of the Casimir-Polder effect, the force between an atom and a conducting plate, in a superconducting circuit consisting of a tunable cavity coupled to a qubit. We will describe an analogous "Casimir force" on the cavity's effective boundary condition, outline the consequences of longitudinal versus transverse coupling between the qubit and cavity, and discuss the relevance of the field self-interaction term (A^2). Finally, we will briefly touch on prospects related to measurement.

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