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Detection of Majorana Fermions in circuit QED JEROME BOURASSA, CLEMENS MUELLER, ALEXANDRE BLAIS, Universite de Sherbrooke — Superconducting quantum circuits, such as the flux and the transmon qubits, have been proposed to measure and control the quantum state of topological qubits based on pairs of Majorana fermions [1-4]. This is possible by making the superconducting qubit transition frequencies sensitive to the fermionic parity representing the topological qubit state. In this talk, we propose to measure the fermionic parity using a flux qubit integrated in a microwave resonator. In this proposal, the flux qubit always remains in its ground state and is used as a passive circuit element which modifies the resonance frequency of the resonator depending on the charge state of a nearby pair of Majorana fermions. Since it is always in its ground state, the requirements on the qubit coherence properties and fabrication parameters are less stringent than in other proposals.
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