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Quantum interface between DC-SQUID and trapped ion DVIR
KAFRI, PRABIN ADHIKARI, University of Maryland, College Park, JACOB TAYLOR, National Institute of Standards and Technology, Gaithersburg, MD — We show how to couple the motional state of a trapped ion to a quantized electrical circuit. The circuit, a DC-SQUID with an inductive nonlinearity, has resonant frequency much larger than that of the ion motion, so a coupling using direct Coulomb interaction is not feasible. Instead, this is achieved through careful modulation of the SQUID inductance with an external magnetic field. By coupling the ion motion to its internal state, this allows for an effective interface between an ion qubit and the circuit, with rates comparable to those of current ion-ion motional gates.

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