

Abstract Submitted
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Radio-frequency quantum point contact in a silicon/silicon-germanium two-dimensional electron system MADHU THALAKULAM, CHRISTIE SIMMONS, ERIC SACKMANN, BJORN VAN BAEL, D.E. SAVAGE, MAX LAGALLY, M.A. ERIKSSON, University of Wisconsin-Madison — Radio frequency quantum point contacts (RF-QPC) are sensitive and fast electrometers. The capability to integrate such devices with semiconductor-based quantum dot systems makes them an attractive candidate for fast charge readout, and the increasing interest in spins in group-IV quantum dots motivates the development of such devices in silicon/silicon-germanium two-dimensional electron systems. We report the operation of an RF-QPC fabricated on a silicon/silicon-germanium heterostructure with an on-chip matching network. An on-chip spiral inductor and the capacitance from the bonding pads define the tank circuit. The inductance and capacitance parameters are optimized to achieve a resonant frequency of approximately one GHz. The operation of RF-QPC at milli-Kelvin temperature and the charge readout of a quantum dot system using an RF-QPC will be discussed.

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