

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Tunable Radio-frequency Quantum Point Contact ANNE-MARIE ROY, OLIVIER SAINT-JEAN RONDEAU, JULIEN CAMIRAND-LEMYRE, MICHEL PIORO-LADRIÈRE, Université de Sherbrooke — Manipulating the spin of single electrons in quantum dots is a promising avenue for quantum information processing. As the readout of the spins is performed via spin-to-charge conversion, establishing a charge sensing technique[1] that is fast and highly sensitive is crucial. For this reason, radio-frequency quantum point contact charge sensors have become widespread[2]. Here we present a tunable quantum point contact charge sensor using a cryogenic variable capacitor[3], tunable from 2 to 12 pF. We obtain optimal impedance matching for different quantum dot devices over a frequency range from 125 to 210 MHz. The flexibility of our setup allows the integration of radio-frequency charge sensors to a variety of nanostructures.

[1]M. Field, C. Smith, M. Pepper et al. Phys. Rev. Lett. 70, 1311 (1993).

[2]R. J. Schoelkopf et al. Science 280, 1238 (1998).

[3]T. Müller et al. Appl. Phys. Lett. 97, 202104 (2010).

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Date submitted: 14 Nov 2014

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