
Magnetocapacitance oscillations in a mesoscopic RC circuit

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Abstract

The dynamical response of mesoscopic conductors constitutes a mostly unexplored area of quantum transport. We here report on the measurements of the high frequency magnetoconductance of a mesoscopic RC circuit. The RC circuit consists of a quantum dot (QD) capacitively coupled to a macroscopic electrode on top of it and tunnel coupled to a wide two dimensional electron gas through a quantum point contact. The QD works in the quantum Hall regime, where two well separated compressible regions are formed. By varying the magnetic fields, electrons in the dot redistribute among these two regions. We found that this process could lead to magnetocapacitance oscillations. Using single electron magnetocapacitance spectroscopy, we can map the magnetic field dependence of the ground state energies of the QD.

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