

Magnetic field asymmetry of non-linear mesoscopic transport as a signature of interactions

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Fundamental Casimir-Onsager symmetry rules for linear response are not verified in non linear transport. Of particular interest is the second order current response of a non centro-symmetric mesoscopic system which is a measure of the sensitivity of conductance fluctuations to the bias. In contrast with the linear response which is a symmetric function of magnetic field for a 2wires measurement, we find that the second order response exhibits a field dependence which contains both a symmetric and antisymmetric part. We analyse flux periodic and aperiodic components of these two quantities in GaAs rings and find that they only depend on the conductance which is varied by more than an order of magnitude. These results are in good agreement with theoretical predictions relating this asymmetric response to the electron interactions.