

Abstract Submitted
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Absolute Negative Resistance Induced by Directional Electron-Electron Scattering in a Two-Dimensional Electron Gas ISMET I. KAYA, Sabanci University, MDBF, Istanbul, Turkey — A ballistic conductor is restricted to have positive three terminal resistance just as a Drude conductor. Intercarrier scattering does not influence the conductivity of the latter transport regime and does not exist in the former. However, as the electron energies increased, in the intermediate regime, single or few intercarrier scattering events starts to dominate the transport properties of a conductor with sufficiently small dimensions. A three-terminal device formed by two electrostatic barriers crossing an asymmetrically patterned two dimensional electron gas displays an unusual potential depression at the middle contact, yielding absolute negative resistance. The device displays momentum and current transfer ratios that far exceed unity. The observed reversal of the current or potential in the middle terminal is interpreted as the analog of Bernoulli's effect in a Fermi liquid. The results are explained by directional scattering of electrons in two dimensions.

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