
SEMINAR FIZIČKOG ODSJEKA

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NEW QUANTUM INTERFERENCE EFFECTS IN TRANSPORT
PROPERTIES OF 2D ELECTRON GAS

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Transport in a two dimensional (2D) electron gas subject to an external magnetic field is analysed in the presence of a longitudinal barrier. We show that quantum interference of the edge states bound by the longitudinal barrier results in a drastic change of the electron dynamics: the degenerated discrete Landau levels are transformed into an alternating sequence of energy bands and energy gaps, the distribution of which being quasi-chaotic. As this dynamics is based on the quantum interference, thermodynamic and transport properties of the 2D electron gas turned out to be extremely sensitive to external fields. In particular, we predict giant oscillations of the ballistic conductance with a change of magnetic field or the gate voltage, coherent Bloch oscillations and non-linear current-voltage characteristics under a relatively weak electric bias voltage.

Voditelj seminara FO

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