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The influence of the spin-orbit effect on the 0.7-anomaly: a functional renormalization group approach OLGA GOULKO, FLORIAN BAUER, JAN HEYDER, JAN VON DELFT, Ludwig-Maximilians Universitaet Munich — In addition to plateaus at integer values of $G_0 = 2e^2/h$, the linear conductance of a quantum point contact shows an anomalous shoulder at around $0.7G_0$ – the so-called 0.7-anomaly. Although the dependence of the 0.7-anomaly on parameters such as the temperature, the magnetic field, the bias voltage etc. has been widely studied, little is known about the influence of spin-orbit effects. We present a microscopic theory for the 0.7-anomaly, based on a one-dimensional tight binding model with a local on-site interaction, a smooth potential barrier and a homogeneous magnetic Zeeman field. In addition, we introduce Rashba and Dresselhaus terms into the Hamiltonian to capture the effect of spin-orbit coupling. We use a functional renormalization group approach to calculate the influence of interactions on the conductance at zero temperature. In this talk we present our theoretical predictions for the shape of the conductance curve, which depends strongly on the angle of the magnetic field if spin-orbit coupling is present. We also provide a detailed microscopic explanation of how the interplay of the magnetic field, the interaction and the spin-orbit coupling influences the conductance.

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