

Magnetoresistance in parallel fields

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Abstract:

We review various aspects of magnetoresistance in (quasi-)two-dimensional systems subject to a parallel magnetic field. Concentrating on single-particle effects, three mechanisms leading to magnetoresistance exist: the orbital effect of the magnetic field, the interplay between spin-orbit coupling and Zeeman splitting, and the influence of the field on spin scattering at magnetic impurities. As for the orbital effect, in addition to its large scale in-plane properties, transport is sensitive to microscopic details of the system in the transverse z -direction. We will discuss different scenarios, in particular, multi-subband systems with or without spatial inversion symmetry. The magnetoresistance profiles contain information on both, the geometry of the confining potential and characteristics of the disorder.