

# INTRINSIC MECHANISM OF ANOMALOUS HALL EFFECT IN A TWO-DIMENSIONAL MAGNETIC SYSTEM WITH IMPURITIES

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We discuss the mechanism of anomalous Hall effect related to the contribution of electron states below the Fermi surface (induced by the Berry phase in momentum space). Our main calculations are made within a model of two-dimensional electron gas with spin-orbit interaction of the Rashba type, taking into account the scattering from impurities. We demonstrate that such an "intrinsic" mechanism can really dominate but there is a competition between the geometric Berry-phase-induced term  $\sigma_{xy}^{II}$  in the Hall conductivity, and the impurity-induced term  $\sigma_{xy}^I$ , related to the contribution of states in the vicinity of Fermi surface. We also show that the contribution to the Hall conductivity from electron states close to the Fermi surface has the intrinsic property as well, and it does not vanish in the clean limit

The main effect of impurity-related contribution is a possible change of sign for the off-diagonal conductivity. The resulting magnitude and sign of the Hall conductivity strongly depend on the electron density in the system.

13.4 cm

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9.7 cm