Skew-scattering contribution in Rashba-type 2D systems with short-range scalar impurity potential. MARIO F. BORUNDA, Texas A&M University, TAMARA NUNNER, THOMAS LUECK, Freie Universtitat Berlin, NIKOLAI SINITSYN, Los Alamos National Lab, CARSTEN TIMM, University of Kansas, TOMAS JUNGWIRTH, Institute of Physics ASCR, JAIRO SINOVA, Texas A&M University — There is a renewed interest in the anomalous Hall effect (AHE) motivated by the fabrication of materials that are both ferromagnetic and semiconducting, diluted magnetic semiconductors (DMS). Experimental and theoretical studies have shown that the skew-scattering contribution can have a dominant role in magnetotransport, especially in the low-impurity-concentration limit. The Hamiltonian describing Rashba-type systems is sufficiently simple to allow analytical solutions, yet it has the features of a typical DMS: (1) spin-orbit coupling, (2) more than one band with momentum-dependent Berry's curvature, and (3) it allows for inter- and intra-band scattering on impurities. We estimate skew-scattering contribution to two-dimensional Rashba-coupled systems in the leading order of expansion in disorder strength. We consider short-range disorder potentials and derive the general formula for arbitrary spin-orbit coupling through a high-order Born approximation.

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