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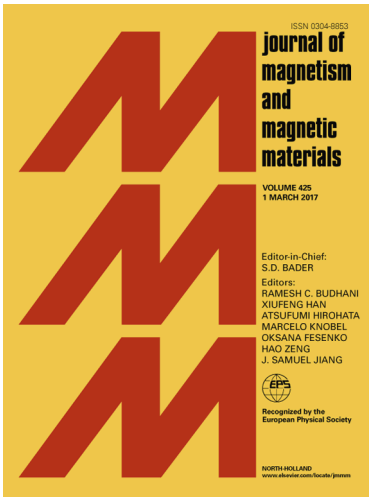

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Anisotropic magnetoresistance in 2DEG with Rashba spin-orbit coupling

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Abstract

We calculate the anisotropic magnetoresistance (AMR) in two dimensional electron gas (2DEG) with Rashba spin-orbit coupling, when the Fermi energy lies at the crossing point of the two energy bands, in the presence of dilute magnetic charged impurities. We use the semiclassical Boltzmann equation and solve it exactly by an ansatz with an anisotropic parameter that is interpreted as a transport time vector. AMR is zero if the electric contribution to scattering overcomes the magnetic one, otherwise it is finite.

Keywords: Rashba spin-orbit coupling, 2DEG, Boltzmann equation, anisotropic magnetoresistance.

1. Introduction

Spin-orbit coupling is induced by the interaction of the electron spin and an effective magnetic field created in its frame of reference due to its momentum and an external electric field. Currently, there are a lot of important applications of this interaction, for instance in spintronic [1, 2]. A representative way to express this interaction in heterostructure lacking inversion symmetry is through the well known Rashba spin-orbit (RSO) coupling. Consequences of RSO coupling

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