Boundary resistance in magnetic multilayers

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Abstract

Quasiclassical boundary conditions for electrochemical potentials at the interface between diffusive ferromagnetic and non-magnetic metals are derived for the first time. An expression for the boundary resistance accurately accounts for the law of conservation of momentum as well as essential gradients of the chemical potentials. Conditions are established at which spin asymmetry of the boundary resistance has a positive or negative sign. Dependence of the spin asymmetry and the absolute value of the boundary resistance on the exchange splitting of the conduction band opens up new possibilities for estimating spin polarization of the conduction band of ferromagnetic metals. Consistency of the theory is checked on existing experimental data. © 2006 IOP Publishing Ltd.