An influence of an effective mass on magnetoresistance in ultrathin Fe/Cr films

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The transport properties of ultrathin metallic sandwich structures of Fe/Cr/Fe are studied as a function of magnetic layers thickness for the current in plane geometry (CIP). Taking into account the band structure obtained from density functional theory (DFT) [1], we determined the basic physical properties of each layer, namely: Fermi energy, relaxation time, effective mass of electrons. Next using the Boltzmann formalism in its extended form [2] we obtain the results for the magnetoresistance (MR). We analyze an influence of spin dependent effective mass, which in present case depends on the sample geometry, on the MR behavior.

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