

AN EXTENDED BOLTZMANN FORMALISM FOR TRANSPORT DESCRIPTION IN THIN Fe-Cr-Fe TRILAYERS

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We present the calculations of Giant Magnetoresistance (GMR) for the thin trilayers $n\text{Fe}/3\text{Cr}/n\text{Fe}$ where $1 \leq n \leq 8$ for the slab geometry. All parameters used for calculations, i.e., the layer potential, the relaxation time, the effective mass and the Fermi energy are determined on the basis of ab initio calculations for the electronic structure of the considered trilayer when the spin polarisation is taken into account. The comparison of semiclassical approach based on the Boltzmann formalism is given. The value of the specularity factor in the Fuchs-Sondheimer theory responsible for scattering electrons from metallic surface is found in an analytical way. The results show an increase of GMR for the samples with different ferromagnetic layer thickness when compared with those obtained from the standard Boltzmann theory.

13.4 cm

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9.7 cm