Abstract of Presentation

Presentation Title:

Influence of spin-orbit coupling on the transport properties of spintronics materials

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Abstract :

Spin-orbit coupling influences all transport properties and gives rise to a number of interesting galvano-magnetic effects that can be exploited technically. Spin density functional theory in combination with relativistic multiple scattering theory supplies a very reliable basis for ab-initio investigations in this field. A corresponding description of bulk or layered materials is usually based on the Kubo-Greenwood or Landauer-Büttiker-formalism, respectively. This is demonstrated by results for the residual resistivity of various magnetic transition metal and diluted magnetic semiconductor alloy systems. Special emphasize will be put on the anisotropic magneto-restistance (AMR). Comparable studies on the tunnelling magneto-resistance (TMR) will deal with Fe/GaAs/Fe. Again, the focus will be put on the anisotropy of the TMR and in particular on the TAMR (tunnelling anisotropic magneto-resistance) that can be observed even in trilayers consisting of a semiconductor or insulator sandwitched by a magnetic and a non-magnetic metallic film.