

Ballistic Magnetoresistance Results in Atomic and Nanometer Size Magnetic Contacts

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In this talk I will review the recent results on ballistic magnetoresistance (BMR) in magnetic nanocontacts obtained in our lab and in many others around the world. I will look at atomic contacts as well as to electrodeposited Ni-Ni nanocontacts where very large BMR have been obtained in 10-30nm section electrodeposited nanocontacts. This very large effect may be due to a dead magnetic layer, containing O, Cl, S or whatever element, that filters adequately the electrons of Ni producing a electric current with full polarization. The physical explanation is explained by the theory of domain wall scattering at the nanocontact of the conducting electrons in such a way that there is a complete nonadiabatic process that conserves the spin transfer. It will be shown that the BMR values in atomic size contacts, up to 20 quantum of conductance, have a universal behaviour that is explained as domain wall scattering. Experiments for Ni, Co, Fe, Fe₃O₄, CrO₂, etc will be shown showing all of them the same type of behaviour.