Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetically-controlled impurities in quantum wires with strong Rashba coupling RODRIGO PEREIRA, Department of Physics and Astronomy, University of British Columbia, Vancouver, BC, Canada, EDUARDO MIRANDA, Instituto de Fisica Gleb Wataghin, Universidade Estadual de Campinas, Campinas, SP, Brazil — We investigate the effect of strong spin-orbit interaction on the electronic transport through non-magnetic impurities in one-dimensional systems. When a perpendicular magnetic field is applied, the electron spin polarization becomes momentum-dependent and spin-flip scattering appears, to first order in the applied field, in addition to the usual potential scattering. By tuning the Fermi level and the Rashba coupling, it is possible to suppress the potential scattering and the spin-flip scattering will dominate at low temperatures. As a result, the resistance of the wire will strongly depend on the magnetic field.

Rodrigo Pereira
Department of Physics and Astronomy, University of British Columbia

Date submitted: 02 Dec 2004 Electronic form version 1.4