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Interplay of Rashba and *sp-d* exchange couplings in magnetic 2DEGs[1] FRANCISCO MIRELES, CCMC-UNAM, Mexico., HENRIQUE H. P. FREIRE, IFSC, Universidade de Sao Paulo, Brazil, J. CARLOS EGUES, IFSC, Universidade de Sao Paulo, Brazil — In diluted magnetic semiconductor (DMS) quantum wells the *sp-d* exchange interaction between the itinerant conduction electrons in the well and the localized electrons in the *d* orbitals of the Mn impurities gives rise to interesting spin-dependent physics [1]. Recently, the interplay of the Rashba spin-orbit and the *sp-d* exchange interactions in Mn-based wells has been recognized via Shubnikov-de-Haas measurements [2]. While the Rashba spin-orbit has been extensively studied in non-magnetic 2DEGs, its role in DMS systems with a competing *sp-d* exchange interaction has not yet been addressed theoretically. In this work we present a ***k.p*** derivation of an effective Hamiltonian for a Mn-based quantum well with competing Rashba and *sp-d* interactions, and show numerical results for the magnetoresistance ρ_{xx} of typical magnetic 2DEGs using our effective Hamiltonian model. Our results shows interesting beating patterns of the ρ_{xx} as a function of the temperature and carrier density which suggests a significant interplay between the spin-orbit and *sp-d* exchange interactions, as a recent experiment observes [2]. [1] J. C. Egues, PRL **78**, 4578 (1998); H. J. P. Freire and J. C. Egues, cond-mat/0412491. [2] Y. S. Gui *et al.* EPL. **65**, 393 (2004).

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