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Spin-polarization and transmission properties in heterostructures with magnetic nano elements ARMEN KOCHARIAN, Department of Physics, California State University, AVAG SAHAKYAN, RUZAN MOVSESYAN, The State Engineering University of Armenia — The problem of electron resonant and non-resonant scatterings on two magnetized barriers is studied in the one-dimension. The transfer-matrix is built up to exactly calculate the coefficient of the electron transmittance through the system of two magnetic barriers with non-collinear magnetizations. The polarization of the transmitted electron wave for resonance and non-resonance transmittances is calculated [Kocharian, et al, JMMM 322, L42, 2010]. The transmittance coefficient and spin polarization can be drastically enhanced and controlled by the angle between the barrier magnetizations. Our result for spin transmission is analogous to Malus's law for passing light polarization through crossed polarizers. This provides efficient control of spin polarization via the applied magnetic field which is an apparent manifestation of the spin- valve effect. The strong dependence of magnetoconductance on the non-colinearity angle in two magnetized barriers resembles the corresponding effects in noncollinear spintronics for a number of other magnetic multilayer heterostructured systems and layered magnetic nanostructures.

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