Tight binding calculation of tunneling conductance of a metal/ferromagnetic junction

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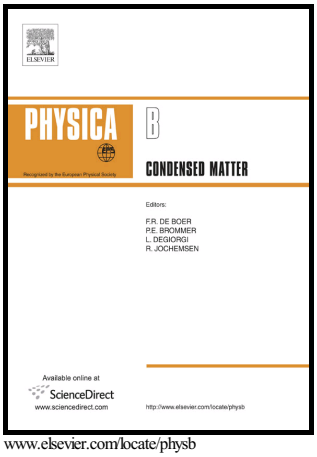

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Tight binding calculation of the tunneling conductance of a metal/ferromagnetic junction

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Abstract

A tight binding approximation was used to describe the electronic properties of a metal/ ferromagnetic junction in a one-dimensional system. The appropriate boundary conditions were calculated to describe the quality of the interface, the non-spin-flip and spin-flip scattering potential. The BTK model was used to compute the reflection and transmission probabilities, and the Landauer formulation was used to calculate the conductance spectrum. It was found that the conductance spectrum changes slope at the bias voltage that reached the bottom of the minority band and the top of the majority band of the ferromagnetic. The conductance spectrum was suppressed for all energies when either the non-spin-flip or spin-flip scattering at the interface increased. However, the conductance spectrum can be enhanced when the interface was taken into account for the appropriate value of the spin-flip and non-spin-flip scattering. In addition, the conductance can be increased by increasing the next-nearest neighbor hopping energy in the ferromagnetic material.

Keywords: A metal/ferromagnetic junction, Tight binding approximation, Tunneling conductance, Lattice model

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