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Transport in Ferromagnet/Superconductor Spin Valves[1] EVAN MOEN, ORIOL T. VALLS, School of Physics and Astronomy, University of Minnesota — We consider transport in realistic Ferromagnet-Superconductor layered nanostructures with a spin-valve structure: $F_1/N/F_2/S$ where F_1 and F_2 denote the ferromagnets, S the superconductor, and N a normal metal spacer usually inserted in these spin-valve devices. These systems exhibit physically intricate proximity effects, including singlet to triplet conversion, which have a large impact on the transport properties and the spin-valve effect. We use a fully self consistent method that ensures that all conservation laws are satisfied. We obtain results for the conductance, G, of the devices as a function of voltage, for all values of the angle ϕ between the magnetizations of the F_1 and F_2 layers. These calculations are performed for experimentally relevant ranges of layer thicknesses, material properties, and interfacial scattering. We consider also spin currents and spin transfer torques in these structures.

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