Abstract Submitted
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**Effect of occupation numbers on exchange coupling in low dimensional magnetic nanostructures**[1] D. TERRADE, H. X. YANG, A. KALITSOV, L. NISTOR, M. CHSHIEV, B. DIENY, SPINTEC, CEA/CNRS/UJF, Grenoble, France — Interlayer exchange coupling (IEC) has been of great interest for spintronic community and has been shown directly related to equilibrium spin current (ESC). Here we present a study of the influence of the electronic occupation numbers on the angular dependence of the IEC in magnetic layered nanostructures with finite thickness ferromagnetic (FM) layers. The calculations were performed within the tight-binding model using the nonequilibrium Green function technique both within perturbation theory and exact diagonalization approaches. We found that the period of IEC oscillations as a function of FM layer thickness has nonmonotonic variation with electronic states occupation numbers (Fermi level position). In the limit of 2-site model it is found that perturbation theory fails to describe correctly exchange coupling angular dependence always giving sinusoidal behavior for the ESC while the exact solution alternates between sinusoidal and strongly nonsinusoidal behavior as a number of electrons in the system is varied.

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