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Spin inelastic electron transport through magnetic nanostructures AARON HURLEY, NADJIB BAADJI, STEFANO SANVITO, Trinity College Dublin — Recent experimental advances in scanning tunneling microscopy make the measurement of the conductance spectra of isolated and magnetically coupled atoms on nonmagnetic substrates possible. Notably, these spectra are characterized by a competition between the Kondo effect and spin-flip inelastic electron tunneling. In particular they include Kondo resonances and a logarithmic enhancement of the conductance at voltages corresponding to magnetic excitations, two features that cannot be captured by second order perturbation theory in the electron-spin coupling. We have now derived a third order analytic expression for the electron-spin self-energy, which can be readily used in combination with the non-equilibrium Green's function scheme for electron transport at finite bias. We demonstrate that our method is capable of semi-quantitative description of the competition between Kondo resonances and spin-flip inelastic electron tunneling at a computational cost significantly lower than that of other approaches. The examples of Co and Fe on CuN are discussed in detail. We also explain the theoretical origin of the conductance assymetry that is present for both spin and non-spin polarized STM tips in the experimentally determined spectra of these atoms.

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