Magnetization processes of nanoparticles embedded into ferromagnetic matrix

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In the field of hard magnetics, interactions between the phases are important and can lead to an appearing of new and unique properties. Especially interesting is an influence of interacting surroundings on magnetization presses of magnetic nanoparticles and a comparison with the Stoner-Wohlfarth model describing magnetic response of single ferromagnetic particle. Magnetic objects can be characterized by the so-called blocking energy E_B and overall magnetic moment μ. The main problem is some obvious indistinguishability - at a given temperature T and field H - let say an object α and β behave similarly (can be activated with the same probability) when $E_B^\alpha - \mu_0 \mu^\alpha H = E_B^\beta - \mu_0 \mu^\beta H$. In a non-interacting system one may omit the indistinguishability by performing magnetic measurements in two different temperatures. The main question is how the possible interactions between particle and its surroundings can influence the indistinguishability effect. In the present work we performed some simulated annealing plus Monte Carlo studies concerning spherical particles embedded into ferromagnetic matrix. Magnetization process of such system depends on exchange interactions of particle, matrix and interface between them. Moreover, the influence of different kind of anisotropy (volume and surface) is also widely discussed.