

Efficient calculation of low energy configurations of nanoparticle ensembles for magnetoresistive sensor devices by means of stochastic spin dynamics and Monte Carlo methods

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By dispersing magnetic nanoparticles in conductive gel-like matrices, magnetoresistive sensors with promising features can be developed [1][2]. Moreover, theoretical investigations of the magnetic nanoparticle ensembles reveal sophisticated magnetic behaviour. While Monte Carlo simulations [3] show a transition between a disordered state and a paramagnetic state, a multitude of low energy configurations is revealed by stochastic spin dynamics simulations [3], both resembling dipole glass behaviour. Here, we present strategies to find these low energy configurations efficiently by simulating demagnetization protocols.

References:

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