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Lattice Induced Configurational Anisotropy in Nanomagnets[1]
WEN ZHANG, NOAH BRAY-ALI , STEPHAN HAAS, University of Southern California — The study of magnetic nanoparticles is evolving into a rich and rapidly growing area, featuring many novel phenomena and potential applications. One of the most important properties of these systems is the magnetic anisotropy, which determines the blocking temperature. Besides the well-known crystalline and shape anisotropies, the competition of exchange and magnetostatic interactions in nanomagnets leads to the formation of a configurational anisotropy, resulting from small deviations of the magnetization from uniformity within the nanostructures. In this talk, I discuss a new type of anisotropy, i.e. the lattice induced configuration anisotropy, which we have studies using Monte Carlo simulations. In particular, a scaling approach has been shown to be effective in obtaining the magnetic properties of nanoparticles. The relationship between anisotropy and blocking temperature will also be discussed. Understanding the influence of anisotropy opens up a new path to designing nanostructured magnetic materials with novel functionalities.

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