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**Discrete Spin Vector Approach for Monte Carlo-based Magnetic Nanoparticle Simulations.** ALEXANDER SENKOV, JUAN PERALTA, RAHUL SAHAY, Department of Physics, Central Michigan University — The study of magnetic nanoparticles has gained significant popularity due to the potential uses in many fields such as modern medicine, electronics, and engineering. To study the magnetic behavior of these particles in depth, it is important to be able to model and simulate their magnetic properties efficiently. Here we utilize the Metropolis-Hastings algorithm with a discrete spin vector model (in contrast to the standard continuous model) to model the magnetic hysteresis of a set of protected pure iron nanoparticles. We compare our simulations with the experimental hysteresis curves and discuss the efficiency of our algorithm.

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