Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effects of dipolar interactions in magnetic nanoparticle systems SERGIU RUTA, Physics Department, University of York, York, UK, ONDREJ HOVORKA, Faculty of Engineering and the Environment, University of Southampton, Southampton, UK, ROY CHANTRELL, Physics Department, University of York, York, UK — Understanding the effects of magnetostatic interactions in magnetic nanoparticle systems is of importance in magnetic recording, biomedical applications such as in hyperthermia cancer treatment, or for sensing approaches in biology and chemistry, for example. In this talk we discuss the macroscopic and microscopic effects of dipole-dipole interactions in three-dimensional assemblies of magnetic nanoparticles in various spatial arrangements, including the BCC, FCC, or randomized lattices. Our study is based on the kinetic Monte-Carlo modelling and concentrates on exploring the effect of the particle arrangement, distributions of particle volumes and anisotropy axes, and the role of thermal effects on the overall behaviour of hysteresis loops, ZFC/FC temperature scans and the magnetization decay data computed during the relaxation to equilibrium. In the case of the FCC lattice we find a counter-intuitive effect where increasing the interaction strength enhances/suppresses the hysteresis loop coercivity at high/low temperatures. The analysis of the domain pattern formation and pair correlation functions suggests for the observed behaviour to be a result of the phenomenon of frustration. We also discuss the possibility of observing the super-ferromagnetic phases on similar syste

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Date submitted: 14 Nov 2013 Electronic form version 1.4