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Anomalous Temperature Dependence of Magnetic Moment in Monodisperse Antiferromagnetic Nanoparticles DANE GILLASPIE, [1,2], B. GU, [3], W. WANG, [3], J. SHEN, [1,2] — 1 Condensed Matter Sciences Division, Oak Ridge National Laboratory*, TN 37831 2 Department of Physics and Astronomy, The University of Tennessee, TN 37996 3 Environmental Sciences Division, Oak Ridge National Laboratory*, TN 37831 Recent experiments [1] and theory [2] from AFM nanoparticles showed that they exhibit sizable net magnetization, which increases with increasing temperature. In order to further understand such peculiar temperature dependence, we have measured the magnetic properties of monodisperse hematite (α-Fe2O3) nanoparticles, grown using a microemulsion precipitation technique, which minimizes the impact of the particle moment distribution on the measured properties of the samples. Our measured results indicate that the net magnetization of these nanoparticles, when small, indeed increases linearly with increasing temperature. This is in sharp contrast to the bulk-like behavior of α-Fe2O3, which was observed in particles with size larger than 120 nm. [1] M. Seehra et al, Phys. Rev. B 61, 3513 (2000) [2] S. Mrup, C. Frandsen, Phys. Rev. Lett. 92, 217201 (2004) *Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U.S. Dept. of Energy under contract DE-AC05-00OR22725

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