Abstract Submitted
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Scaling collapse of the irreversible magnetization of ferromagnetic thin films[1] R. DAS, A.F. HEBARD, University of Florida, Department of Physics — The irreversible magnetization, ΔM, defined as the difference of field-cooled magnetization M_{FC} and zero-field-cooled magnetization M_{ZFC}, has been measured for a variety of ferromagnetic thin films as a function of magnetic field H at different temperatures T. Isotherms of ΔM show maxima ΔM_{max} at characteristic temperature-dependent fields $H_m(T)$. At very low and high magnetic fields the values of M_{FC} and M_{ZFC} converge and ΔM is observed to approach zero in these limits. If $\Delta M/\Delta M_{max}$ is plotted as a function of H/H_m for a given ferromagnetic system, the graphs for different temperatures collapse onto the same curve. This scaling collapse is clearly seen for three different ferromagnetic thin-film systems: polycrystalline gadolinium, phase separated manganites, and single domain Ni nanomagnetic grains embedded in an insulating host. Similar scaling behavior has also been observed in spin-glass material [1]. These results represent a heretofore unrecognized scaling behavior that appears to apply to a broad range of ferromagnetic systems. [1] V. S. Zotev, G. G. Kenning, and R. Orbach, Phys. Rev. B **66**, 014412 (2006)

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