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Hysteresis-Loop Overskewing RALPH SKOMSKI, Dept. Physics & Astr. and NCMN, University of Nebraska, T.A. GEORGE, D.J. SELLMYER — The performance of permanent magnets is largely determined by the magnetostatic energy stored in free space (energy product), which depends on both materials properties and magnet geometry. The latter usually differs from laboratory shapes such as spherical samples, and demagnetizing-field corrections must be applied to compare different geometries. However, in nanostructures, especially in thin films, the macroscopic demagnetizing factors D predicted from Maxwell's equations [1] yield unphysical overskewed hysteresis loops [2]. The overskewing is probably a nanoscale effect, but its origin has remained controversial. Our explanation is that nanoscale magnetization processes violate a main condition for the applicability of macroscopy demagnetizing factors, namely the uniform character of the magnetization. In bulk magnets, the magnetization inhomogeneities effectively average to zero, but this is no longer the case if any of the dimension of the magnet becomes small. We explicitly consider granular thin films, where we find a real-structure dependent reduction D, as contrasted to the sometimes assumed infinite slope $M(H)$ at coercivity. — This research is supported by BREM (RS), ARPA-E, DOE (DJS), and NCMN. — **References:** [1] J. A. Osborn, Phys. Rev. **67**, 351 (1945); [2] R. Skomski, J.- P. Liu, and D. J. Sellmyer, Phys. Rev. B **60**, 7359 (1999).

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