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**Anisotropy-Compensated Magnetic Nanostructures**[1] RALPH SKOMSKI, TOM A. GEORGE, D.J. SELLMYER, NCMN and Dept. Physics & Astronomy, University of Nebraska — Nanostructuring can be used to tailor the magnetic anisotropy $K_1$ as function of temperature, which is important in permanent magnetism and magnetic recording. Anisotropy is an atomic quantity, but the ferromagnetic exchange ensures an anisotropy averaging over a few nanometers, in contrast to the absence of nanoscale Curie-temperature averaging [1]. An intriguing and largely overlooked feature is the possibility of temperature- dependent anisotropy zeros, which yields a potential write-field reduction in magnetic recording. On an atomic scale, this effect is well-known but limited to a relatively narrow range of rare- earth transition-metal intermetallics. Nanostructuring greatly extends the range of materials. Explicitly considered structures are thin films, where the determination of the anisotropy zero (s) yields algebraic equations whose roots depend on the thicknesses, Curie temperatures, and zero-temperature anisotropies of the involved phases. On a somewhat larger length scale (¿ 5 to 10 nm), there is no longer a well-defined anisotropy, but the corresponding micromagnetic corrections are easily incorporated into the theory. - [1] R. Skomski, "Simple Models of Magnetism," University Press, Oxford 2008.

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