Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Low-Temperature Expansion of a Model Describing Helical Magnetic Phases in Rare-Earth Heterostructures DOUGLAS LOVELADY, ISAAC BRODSKY, DAVID RABSON[1], University of South Florida — The variety of magnetic phases observed in rare-earth heterostructures at low temperatures, such as Ho/Y, may be elucidated by an ANNNI-like model Hamiltonian. In previous work modeling bulk Ho, such a Hamiltonian with a one-dimensional parameter space (possibly pressure) produced a single multicritical point, in consequence of which there was no long-range order at zero temperature. In contrast, the parameter space of the heterostructure model is three-dimensional, and instead of an isolated multicritical point, we find two-dimensional multicritical regions. In an example of Villain's "order from disorder," an infinitesimal temperature breaks the ground-state degeneracy. In first order of a low-temperature expansion, we find that the degeneracy is broken everywhere in a multicritical region except on a line. In higher orders, the line may give way to a set of isolated multicritical points, or it may vanish entirely, or it may remain a multicritical line. We present exact computational results on the fate of a multicritical region in this model.

[1]DAR is a Cottrell Scholar of Research Corporation, which sponsored part of this research.

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Date submitted: 05 Dec 2004 Electronic form version 1.4