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Universality Classes of Weakly Anisotropic 2D Heisenberg Ferromagnets DONALD PRIOUR, Youngstown State University — Per the Mermin-Wagner theorem, two dimensional isotropic Heisenberg ferromagnets (i.e. as in a delta doped magnetic semiconductor) are devoid of long range ferromagnetic order at finite temperatures. Nevertheless, even a small degree of anisotropy very effectively stabilizes finite temperature ferromagnetism. The ferromagnetic phase may be divided into two regions, 2D ferromagnets in which the anisotropic term favors orientation of the magnetic moment parallel to the plane, and systems in which the easy axis is perpendicular to the plane. Using large scale Monte Carlo calculations (Wolff cluster updates combat critical slowing down near T_c) to calculate critical exponents such as ν and μ (associated with the correlation length ξ and the magnetization, respectively), we determine the universality class of the magnetic phases in regions where planar moments are favored and those in which perpendicularly oriented moments are preferred. Based on the results, we determine if the isotropic limit is a boundary between two distinct universality classes, if critical exponents vary continuously with the anisotropy parameter, or if planar and vertical easy axis ferromagnetic phases are of the same universality class despite being qualitatively distinct in other ways.

Donald Priour
Youngstown State University

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