

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Infinite randomness and “quantum” Griffiths effects in a classical system: the randomly layered Heisenberg magnet PRIYANKA MOHAN, RAJESH NARAYANAN, Department of Physics, Indian Institute of Technology Madras, THOMAS VOJTA, Missouri University of Science and Technology — We investigate the phase transition in a three-dimensional classical Heisenberg magnet with planar defects, i.e., disorder perfectly correlated in two dimensions. By applying a strong-disorder renormalization group, we show that the critical point has exotic infinite-randomness character. It is accompanied by strong power-law Griffiths singularities. We compute various thermodynamic observables paying particular attention to finite-size effects relevant for an experimental verification of our theory. We also study the critical dynamics within a Langevin equation approach and find it extremely slow. At the critical point, the autocorrelation function decays only logarithmically with time while it follows a nonuniversal power-law in the Griffiths phase.

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Date submitted: 15 Nov 2009

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