

Abstract Submitted  
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**Are the diluted antiferromagnet in a field and the random-field Ising model in the same universality class?** HELMUT G. KATZGRABER, Texas A&M University, BJOERN AHRENS, ALEXANDER K. HARTMANN, Institut fuer Physik, Universitaet Oldenburg — We perform large-scale Monte Carlo simulations using the Chayes-Machta and parallel-tempering algorithms to study the critical behavior of both the diluted antiferromagnet in a field (30% dilution) and the random-field Ising model with Gaussian random fields for different field strengths. For small fields, analytical calculations by Cardy [Phys. Rev. B 29, 505 (1984)] predict that both models should share the same universality class. However, a detailed finite-size scaling analysis of both the Binder cumulant and the two-point finite-size correlation length suggests that even in the limit of small fields both models are not in the same universality class. Therefore, care should be taken when interpreting (experimental) data for diluted antiferromagnets in a field using the random-field Ising model. Finally, we present approximate analytical expressions based on our numerical data for the phase boundaries of both models.

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