

Avalanches in the 3D-Gaussian Random Field Ising Model

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The 3D-Gaussian Random Field Ising Model¹ is widely used as a prototype model for the study of avalanche dynamics. For a critical amount of disorder R_c , this model reproduces the scale-free behaviour present in many natural systems². However, numerical simulations tend to show a distorted distribution of avalanches because of the finite size of the lattice and the persistence of the effects caused by the discrete nature of the simulation³. We can identify these effects with the presence of small non-critical avalanches –known as lattice-animals in percolation theory⁵– and large spanning avalanches in the critical and subcritical regime. In order to avoid the presence of the non-critical spanning avalanches different techniques⁶ and methods of classification^{3,4} have been proposed. We have developed a technique⁷ that allows to improve the classification of the avalanches. We will also discuss the effect of the lattice animals from the analysis of the interevent times⁸ and avalanche rates.

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