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Work distributions in the T=0 Random Field Ising Model XAVIER ILLA, Helsinki University of Technology, JOSEP MARIA HUGUET, EDUARD VIVES, Universitat de Barcelona — The T=0 Random Field Ising Model is a prototype model for the study of collective phenomena in disordered systems. The model can be numerically studied from two different points of view: on the one hand, the exact ground state calculation provides an approach to the equilibrium phase diagram. On the other the use of a local relaxation dynamics based on single spin-flips provides a good framework for the understanding of avalanche dynamics and hysteresis, which is closer to experimental observations. In this sense, the model is a good workbench for the comparison of equilibrium and out-of-equilibrium trajectories. We perform a numerical study of the three-dimensional Random Iield Ising Model at T=0. We compare work distributions along metastable trajectories obtained with the single-spin flip dynamics with the distribution of the internal energy change along equilibrium trajectories. The goal is to investigate the possibility of extending the Crooks fluctuation theorem to zero temperature when, instead of the standard ensemble statistics, one considers the ensemble generated by the quenched disorder. We show that a simple extension of Crooks fails close to the disordered induced equilibrium phase transition due to the fact that work and internal energy distributions are very asymmetric.

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