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Thermodynamics of the two-dimensional random-bond Ising model CREIGHTON K. THOMAS, Texas A&M University, HELMUT G. KATZGRABER, Texas A&M University and ETH Zurich — The two-dimensional Ising spin glass possesses the disorder and frustration necessary to describe the rich behavior found in glassy materials with complex free-energy landscapes. Recently-developed exact algorithms for this model with arbitrary quenched bond disorder have allowed for equilibrium simulations of systems far larger than those accessible by other methods. We use a Pfaffian technique to measure thermodynamic quantities such as the specific heat and the domain-wall free energy to characterize the phase transitions in this model as either temperature or disorder strength is varied. We also present precision measurements on the disorder-temperature phase diagram of this model, including a detailed study of the reentrance that has been seen for bimodal disorder.

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