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Critical Behavior of Lévy Spin Glasses JUAN CARLOS ANDRESEN, Department of Physics, ETH Zurich, HELMUT G. KATZGRABER, Department of Physics, Texas A&M University & ETH Zurich — Universality, one of the foundations of the theory of critical phenomena, is well established for many problems in statistical physics. However, there is still debate if changing the disorder between the spins-spin interactions in spin glasses can influence the universality class of the system. This apparent violation of universal behavior can be attributed to the numerical complexity of these systems which limits simulations to small systems sizes, typically paired with strong corrections to scaling. Although it is well established that universality is not violated for nearest-neighbor spin glasses with compact disorder distributions (e.g., Gaussian and bimodal), some studies suggest that this might not be the case when the disorder distributions are broad, as in the case of the Lévy distribution. Using large-scale Monte Carlo simulations that combine parallel tempering with specialized cluster moves, as well as innovative scaling techniques, we show that Lévy spin glasses do obey universality for the system sizes studied. Furthermore, we probe recent analytical predictions made for the critical temperature of Lévy spin glasses as a function of the disorder distribution width.

Juan Carlos Andresen
Department of Physics, ETH Zurich

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