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$LiHo_xY_{1-x}F_4$ **in the highly-diluted limit** JUAN CARLOS ANDRESEN, ETH Zurich, MOSHE SCHECHTER, Department of Physics, Ben Gurion University, VADIM OGANESYAN, Department of Engineering Science and Physics, College of Staten Island, HELMUT G. KATZGRABER, Department of Physics, Texas A&M University & ETH Zurich — The rare-earth material $LiHo_xY_{1-x}F_4$ has attracted much attention recently, not only because it is well described by a long-range dipolar Ising model, but also because it has a rich phase diagram in the temperature–concentration plane that makes it especially interesting to explore exotic magnetic phenomena. The existence of a spin-glass phase in this material has been a long-standing controversy. In particular, it is unclear if the spin-glass phase extends to the low-concentration limit, or if an exotic anti-glass state emerges. Using large-scale Monte Carlo simulations we probe this difficult regime of the phase diagram.

Juan Carlos Andresen
ETH Zurich

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