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Competing Low-Temperature Phases in a Dilute Ising Magnet M.A. SCHMIDT, D.M. SILEVITCH, T.F. ROSENBAUM, University of Chicago, G. AEPPLI, University College, London — LiHo(x)Y(1-x)F4 serves as a physical manifestation of the Ising model in transverse field with controllable disorder. At dilute Ho3+ dipole concentration, the combination of ferromagnetic and antiferromagnetic couplings via the spatial anisotropy of the dipolar coupling, disorder, and random internal fields combine to produce a variety of possible ground states. We show for x = 0.045 the ability to choose between spin liquid and spin glass behavior with proper thermal preparation. We present both linear and nonlinear magnetic susceptibility data as well as magnetic pump/probe techniques to quantify the stability of the liquid, and to probe the coupling between the spin states and the nuclear spin bath.

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