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Nonlinear and ac Susceptibility of the Dilute Ising Magnet $\mathbf{LiHo_xY_{1-x}F_4}$[1] JEFFREY QUILLIAM, SHUCHAO MENG, CHAS MUGFORD, JAN KYCIA, Department of Physics and Astronomy, University of Waterloo — Recent work has called into question the existence of a spin glass transition in the dilute dipolar Ising magnet $LiHo_xY_{1-x}F_4$ [1]. Other work has suggested that there is an exotic spin liquid phase found at a Ho concentration of $x = 0.045$ [2]. In order to carefully study the dynamics of this system, we have put together a SQUID magnetometer which allows for measurements of ac susceptibility and nonlinear susceptibility over a large frequency range. We present results from measurements on single crystals of $LiHo_xY_{1-x}F_4$, particularly on an $x = 0.045$ sample, in an attempt to either reproduce the exotic "anti-glass" physics that was previously observed or to detect a spin glass transition. [1] P. E. Jonnson et al. PRL 98, 256403 (2007) [2] S. Ghosh et al. Science 296, 2195 (2002)

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