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Study of magnetism at the atomic level in highly doped $\mathbf{LiHo_xY_{1-x}F_4}$ J.A. RODRIGUEZ, A.A. ACZEL, S.R. DUNSIGER, G.J. MACDOUGALL, G.M. LUKE, McMaster University, P.L. RUSSO, TRIUMF, A.T. SAVICI, Brookheaven National Laboratory, Y.J. UEMURA, Columbia University, C.R. WIEBE, Florida State University — $LiHo_xY_{1-x}F_4$ is believed to be a physical realization of the ferromagnetic transverse field Ising model. Nevertheless, studies show deviations from the theoretical expectations. One of these differences is the appearance of an anomalous paramagnetic phase after the spin glass state is destroyed by dilution. χ_{AC} measurements motivated some authors to refer to this phase as an "anti-glass". Most of the experimental results on the anti-glass phase have been performed at a single Ho concentration ($x = 4.5\%$). In order to better understand the magnetic properties of this system, we performed zero field and longitudinal field μSR measurements in three highly diluted samples (x = 0.02, 0.045 and 0.08), each of which was expected to lie within the anti-glass phase. Our measurements probe the dynamic behavior of the system in a higher frequency window than the existing χ_{AC} studies, and have the advantage of being performed with a microscopic probe. We found that there is no qualitative difference on the magnetic behavior upon dilution. In this talk we will discuss the fluctuation of magnetic moments down to base temperature ($\sim$20mK) and in the presence of a transverse magnetic field. We will also discuss our results on the basis of an independent-ion picture.

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