Barkhausen noise in the Ising Ferromagnet LiHo$_x$Y$_{1-x}$F$_4$ JIAN XU, Univ of Chicago, DANIEL SILEVITCH, THOMAS ROSENBAUM, Caltech — LiHoF$_4$ is an S=1/2 dipole-coupled Ising ferromagnet with a Curie temperature, T$_c$ =1.53 K. Partially substituting non-magnetic yttrium for the magnetic holmium suppresses T$_c$ for moderate doping, but crucially also introduces disorder. The combination of the random dilution of the Ho^{3+} ions, the off-diagonal components of the dipole interaction, and the application of a magnetic field transverse to the Ising axis, produces a site-random-field along the Ising axis. The phase boundary as a function of temperature and transverse field is known and the random-field domain pinning can be tuned reversibly. Here, we use Barkhausen noise techniques to study domain reversal and avalanche dynamics in this model quantum magnet, focusing on the competing effects of random-field pinning and quantum tunneling on the avalanche dynamics.

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