Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Dispersive microwave magnetometry of single molecule magnet crystals M. HATRIDGE, J. CLARKE, UC Berkeley/LBNL, R. VIJAY, J.J. LEE, I. SIDDIQI, QNL, UC Berkeley, G. TIMCO, R. WINPENNY, U. Manchester — Dispersive microwave readout of SQUIDs is a promising technique for magnetometry of molecular magnets, as it offers good sensitivity, high bandwidth, and minimal back action. We have fabricated a sample consisting of a 1.5 GHz aluminum coplanar stripline resonator with a quality factor Q=1000, terminated with a Al-AlO$_x$-Al unshunted tunnel junction SQUID with loop area 9 μm^2. Flux signals coupled to the SQUID loop are detected as changes in the phase of the reflected microwave signal. We present data characterizing the effective flux noise of the detector as a function of microwave drive power and flux bias. By exploiting the enhanced sensitivity when the resonator is operated in the nonlinear regime we achieve a minimum effective flux noise of 0.5-1 $\mu\Phi_0$ / rt Hz. This effective flux noise in the nonhysteretic regime is presently limited by our system noise temperature of 10 K. Data showing low field T_1 dispersion measured on a small crystal of Cr_7Ni diluted in Cr_8 will be presented. We acknowledge support from AFOSR and the US DOE.

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Date submitted: 15 Jan 2009

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