Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Ground States of a Disordered Frustrated Quantum Dimer Magnet[1] ALEXANDER HRISTOV, MAXWELL SHAPIRO, IAN FISHER, Stanford University, MINSEONG LEE, LINSEY RODENBACH, ASHLEY BERNHEISEL , EUN SANG CHOI, JU-HYUN PARK, Florida State University, LEONARDO CIVALE, Los Alamos National Laboratory, TIM MUNSIE, GRAEME LUKE, McMaster University — We present results of thermodynamic measurements of the site-diluted spin-dimer magnet $Ba_3(Mn_{1-x}V_x)_2O_8$, including magnetization, torque magnetometry, and AC susceptibility. The parent compound $Ba_3Mn_2O_8$ is a frustrated $S = 1$ quantum dimer-magnet with a singlet ground state, and triplet and quintuplet excitations. A magnetic field can be used to tune the energy spectrum of this system, yielding successive triplet and quintuplet condensates at low temperatures. Site substitution with $S = 0$ V breaks Mn-dimers, introducing site disorder into the high-field ordered states. This substitution also introduces unpaired $S = 1$ Mn ions, and it has been an open question whether such spins order at low temperatures. Here, we present evidence of the spin-freezing of unpaired Mn ions below 240mK for all compositions measured, from x=0.05 to 0.85. We also present the evolution of the high field ordered state with increasing disorder.

[1]NSF DMR-Award 1205165

Alexander Hristov
Stanford Univ

Date submitted: 14 Nov 2014 Electronic form version 1.4