Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Muon Spin Relaxation Studies of the Magnetically Frustrated Double Perovskite Ba2CaOsO6 J.P. CARLO, Department of Physics, Villanova University, C. THOMPSON, Department of Chemistry and Chemical Biology, McMaster University, T. MEDINA, T.J.S. MUNSIE, Department of Physics and Astronomy, McMaster University, J. MUNEVAR, Centro Brasiliero Pesquisas Fisicas (CBPF), Y.J. UEMURA, Department of Physics, Columbia University, J.E. GREEDAN, Department of Chemistry and Chemical Biology, McMaster University — The double perovskite structure $A_2BB'O_6$, in which antiferromagnetically-correlated magnetic B′ cations form an edge-sharing tetrahedral network, is an ideal laboratory for geometric magnetic frustration. The versatility of the perovskite structure enables systematic studies as a function of lattice distortion and moment size, and with 4d and 5d cations, spin-orbit coupling (SOC). Systems with large moments (d^3) tend toward antiferromagnetic order, albeit at $T < |\Theta_{CW}|$. Systems with small moments (d^1) tend toward disorder, including glassy and singlet ground states. d^2 systems form a "middle ground" in which a variety of ground states are observed, and theory indicates a wealth of accessible behavior in systems with sizable SOC. Here we report on muon spin relaxation experiments of the $5d^2$ system Ba_2CaOsO_6, which exhibits an undistorted cubic structure down to low temperatures, and in which long-lived muon spin precession is observed below 50K. These results are compared to related compounds, including the isostructural Ba_2YReO_6, an isoelectronic $5d^2$ system exhibiting glassy behavior, and Ba_2YRuO_6, a $4d^3$ system exhibiting commensurate antiferromagnetic order.

Jeremy Carlo
Villanova University

Date submitted: 15 Nov 2013 Electronic form version 1.4