Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Excitations and enhanced coupling at the magnetic metal-insulator transition in NaOsO3 and Cd2Os2O7** S. CALDER, J. H. LEE, M. B. STONE, ORNL, J. G. VALE, C DONNERER, UCL, N. A. BOGDANOV, IFW Dresden, J LANG, APS, M FEYGENSON, ORNL, X LIU, CAS, M. H. UPTON, D. CASA, APS, M. D. LUMSDEN, Z. ZHAO, J.-Q YAN, ORNL, Y.G. SHI, Y.S. SUN, Y. TSUJIMOTO, K YAMAURA, NIMS, D. MANDRUS, University of Tennessee, S. NISHIMOTO, J. VD BRINK, IFW Dresden, J. P. HILL, BNL, D. F. MCMORROW, UCL, A. D. CHRISTIANSON, ORNL — 5d oxides provide new paradigms of cooperative interactions that drive novel emergent behavior. This is exemplified in the osmates $NaOsO_3$ and $Cd_2Os_2O_7$ that host MITs where magnetic order appears intimately entwined. However, unlike the iridates where spin-orbit coupling (SOC) behavior dominates, in the $5d^3$ osmates an orbital singlet is expected and reduced effect of SOC. We measure the inelastic spectra with neutrons and RIXS. Our results uncover the 5d-manifold splitting to reveal a suppressed role of SOC in the creation of the electronic ground state but dominant behavior in the creation of the magnetic state. Moreover at the MIT in $NaOsO_3$ we find a giant spin-phonon coupling and in $Cd_2Os_2O_7$ a magnetic excitation corresponding to a superposition of multiple spin-flips.

Stuart Calder
ORNL

Date submitted: 06 Nov 2015 Electronic form version 1.4