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Raymond Osborn, Peter Khalifah, Stephen Nagler, Mark Lumsden, Christopher Frost, Robert Bewley, *Magnetic Excitations below the Orbital Phase Transition of  $La_4Ru_2O_{10}$* , Bull. Am. Phys. Soc., APS March Meeting, 2004.

**Magnetic Excitations below the Orbital Phase Transition of  $LaRuO_3$** , RAYMOND

OSBORN, Argonne National Laboratory, PETER KHALIFAH, STEPHEN NAGLER, MARK LUMSDEN, Oak Ridge National Laboratory, CHRISTOPHER FROST, ROBERT BEWLEY, Rutherford Appleton Laboratory, UK — We have measured magnetic excitations in the layered ruthenate compound,  $LaRuO_3$ , which undergoes a first-order orbital phase transition at 160K [P. Khalifah, R. Osborn, Q. Huang, H. W. Zandbergen, R. Jin, Y. Liu, D. Mandrus, R. J. Cava, Science **297**, 2237 (2002)]. Inelastic neutron scattering from polycrystalline samples showed that the magnetic response of the high-temperature phase is quasielastic, arising from spin fluctuations within the  $S=1$  ground state of the 4  $d$ -electrons, but becomes predominantly inelastic in the low-temperature phase with an excitation centered at 40 meV. New single crystal measurements using the the HB3 triple axis spectrometer (HFIR, ORNL) and MAPS spectrometer (ISIS Pulsed Neutron Facility) reveal a strong  $Q$ -dependence of  $S(\mathbf{Q})$ , reflecting the importance of interionic interactions. We discuss possible models of the magnetic excitation spectrum and their relevance to the orbital phase transition.