Abstract Submitted
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Dimerized Excitations in $La_4Ru_2O_{10}$[1] JOHN-PAUL CASTELLAN, R. OSBORN, S. ROSENKRANZ, Argonne National Laboratory, Argonne, IL 60439, M.B. STONE, S.E. NAGLER, M.A. LUMSDEN, Oak Ridge National Laboratory, Oak Ridge, TN 37831, P. KHALIFAH, SUNY Stony Brook, Stony Brook, NY 11794. — The interplay between orbital, spin and charge degrees of freedom is at the forefront of condensed matter physics. The discovery of orbital ordering in $La_4Ru_2O_{10}$ [1] offers a unique opportunity to study orbital phenomena in a 4d transition metal oxide. $La_4Ru_2O_{10}$ undergoes a structural phase transition at $\sim$158K, below which there is a spin gap of $\sim$40 meV caused by Ru-O-Ru dimerization. We have performed single crystal time-of-flight neutron scattering measurements on the ARCS spectrometer at the SNS in "sweep" mode, a new technique in which neutron events are measured during continuous sample rotation, in order to quickly and efficiently map out four-dimensional volumes of S(q,w). With this method, we measured the structure factors and full dispersion of the singlet-triplet excitations as a function of **Q** and w. A model of the orbital ordering producing the magnetic excitations and the event-based technique used for their measurement will be discussed.

[1] P. Khalifah, et al., Science **297**,2237 (2002)

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