Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Neutron scattering study of novel pseudogap excitations in the high-temperature superconductor $HgBa_2CuO_{4+\delta}$[1] YANG TANG, M.K. CHAN, C. DOROW, M. VEIT, Y. GE, M. GREVEN, Univ of Minn - Minneapolis, L. MANGIN-THRO, P. BOURGES, Y. SIDIS, Laboratorie Léon Brillouin, France, D.L. ABERNATHY, Oak Ridge National Laboratory — Following the discovery of universal novel magnetic order in the pseudogap phase of the cuprates [B. Fauqué et al. PRL 96, 197001 (2006); Y. Li et al., Nature 455, 372 (2008)], our inelastic neutron scattering measurements of $HgBa_2CuO_{4+\delta}$ revealed two weakly-dispersive excitation branches that appear to be associated with this ordered state [Y. Li et al., Nature 468, 283 (2010); Y. Li et al., Nature Phys. 8, 404 (2012)]. Here we report new results on the doping and momentum dependence of the excitations. The momentum-transfer dependence of the mode intensities is inconsistent with traditional magnetic or structural form factors. Polarized neutron scattering results suggest a possible dual magnetic and structural nature of the excitations

[1]Work supported by DOE-BES.

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Date submitted: 15 Nov 2013 Electronic form version 1.4