Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

What does resonant inelastic x-ray scattering at the Cu L-edge measure? CHUNJING JIA, BRIAN MORITZ, THOMAS DEVEREAUX, Stanford Institute for Materials and Energy Sciences, SLAC National Laboratory and Stanford University, Menlo Park, CA 94025, USA, KRZYSZTOF WOHLFELD, 1) SLAC and Stanford University; 2) Institute of Theoretical Physics, University of Warsaw — Recent resonant inelastic x-ray scattering (RIXS) experiments at the transition metal L-edge of copper oxides suggest that this technique can be regarded as one of the best momentum-resolved probes of low energy excitations. However, the theoretical understanding of this technique remains incomplete [1]. Here we show, using both numerical studies and analytical approaches, which low energy excitations are probed by RIXS in both undoped and doped cuprates, as modeled by the Hubbard Hamiltonian. We conclude on a qualitative level that (i) RIXS is sensitive to the spin dynamical structure factor in the cross-polarized geometry, whereas (ii) RIXS is sensitive primarily to the A_{1g} projected charge dynamical structure factor, i.e. to both charge excitations and the two-spin excitations (including e.g. bimagnons) in the parallel scattering geometry.

[1] C. J. Jia *et al.*, Nature Communications 5, 3314 (2014).

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Date submitted: 14 Nov 2014 Electronic form version 1.4