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Ultrafast Imaging of Real Space Response Functions YAO WANG, CHUNJING JIA, Department of Applied Physics, Stanford, CA 94305, BRIAN MORITZ, THOMAS DEVEREAUX, Stanford Institute of Materials and Energy Sciences, SLAC NATIONAL ACCELERATOR LABORATORY 2575 Sand Hill Road, Menlo Park, CA 94025 — Understanding the dynamics of spin and charge excitations are critical for the study of correlated materials, such as cuprates. Inelastic X-ray scattering can reveal extensive information related to ultrafast dynamical details about the spin and charge structure factors. To obtain a theoretical understanding, we performed small-cluster exact diagonalization calculations utilizing single-band and three-band Hubbard models with both periodic and open boundary conditions. We demonstrate the ability to track long time behavior; and show that this method can be utilized to study the response dynamics of various materials, such as correlated and chemical systems as well as biological molecules.

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