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A Computational Study of Time-resolved Resonant Inelastic X-ray Scattering YUAN CHEN, YAO WANG, Department of Applied Physics, Stanford University; SLAC National Accelerator Laboratory, Stanford Institute for Materials and Energy Sciences, BRIAN MORITZ, THOMAS DEVEREAUX, SLAC National Accelerator Laboratory, Stanford Institute for Materials and Energy Sciences — Resonant inelastic X-ray scattering (RIXS) is a spectroscopic technique widely used in the characterization of elementary excitations including charge, magnetic, and orbital degrees of freedom. With growing time resolution, these X-ray sources paved the way for time-resolved experiments, which provide a powerful tool to track the evolution of intertwined orders based on the information extracted from elementary excitations. To take advantage of RIXS in ultrafast dynamics, we perform the calculations of time-resolved nonequilibrium RIXS in a pump-probe process. The pump-induced resonance effects in the particle-hole continuum reflect the connection to incident energy, while the modulation of dispersions indicate the change of underlying interactions out of equilibrium. Due to the rich information obtained from trRIXS, this study provides a theoretical understanding of the change of various elementary excitations and their interplay with electrons in a pump-probe experiment.

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