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Charge density wave melting in a correlated system: real-time dynamics in the Hubbard-Holstein model BRIAN MORITZ, Northern Illinois University and the University of North Dakota, CHENG-CHIEN CHEN, Advanced Photon Source, Argonne National Laboratory, THOMAS P. DEVEREAUX, SIMES and Division of Materials Science, SLAC National Accelerator Laboratory, MICHEL VAN VEENENDAAL, Northern Illinois University and the Advanced Photon Source, Argonne National Laboratory — Strongly correlated materials exhibit an intricate interplay between multiple degrees of freedom that can lead to competing phases with distinct broken symmetry. We study this interplay via the real-time dynamics in the photo-induced melting of the charge density wave state of the Hubbard-Holstein model. Using small cluster sparse matrix exact diagonalization and Krylov subspace techniques, we simulate the temporal evolution of the many-body wavefunction to reveal both the charge and lattice dynamics as a function of electron-electron and electron-phonon interaction strength. We study the behavior in proximity of the transition to the competing antiferromagnetic phase and comment on the character of the photo-induced transient state.

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