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Real-time study of light-enhanced superconductivity MICHAEL SENTEF, Max Planck Institute for the Structure and Dynamics of Matter, Hamburg, ALEXANDER KEMPER, North Carolina State University, ANTOINE GEORGES, Ecole Polytechnique and College de France, Paris, CORINNA KOLLATH, HISKP, University of Bonn — Resonant pumping of IR-active phonons with lasers enables the ultrafast control of the crystal lattice in solids [1]. It has been shown that transient states with significantly modified electronic properties can be created on picosecond time scales, such as a light-induced state at elevated temperatures with optical properties in close resemblance to those of a superconductor [2]. In our work, we investigate theoretically a situation in which a change of the electronic hopping leads to a modified density of states in real time [3]. This modification, together with electron-phonon coupling, enhances superconductivity if the system is at thermal equilibrium. Our study monitors the out-of-equilibrium time evolution of the electronic momentum distribution and the superconducting order parameter. We show that the condensate dynamics dominates the initial enhancement of superconducting order, and that energy dissipation through electron-phonon scattering helps this enhancement. [1] M. Frst et al., Nature Phys. 7, 854 (2011) [2] M. Mitrano et al., arXiv:1505.04529 [3] M. A. Sentef et al., arXiv:1505.07575

Michael Sentef
Max Planck Institute for the Structure and Dynamics of Matter, Hamburg

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