

Abstract Submitted
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Photo-induced Subpicosecond Temperature Jump in MoSe₂ bilayer¹ MING-FU LIN, CLEMENS WENINGER, SLAC - Natl Accelerator Lab, VIDYA KOCHAT, AMEY APTE, XIANG ZHANG, PULICKEL AJAYAN, Rice University, OLEG PREZHDO, University of Southern California, KRISTIN PERS-SON, Lawrence Berkeley Laboratory, AIICHIRO NAKANO, University of South-ern California, RENKAI LI, XIJIE WANG, SLAC - Natl Accelerator Lab, PRIYA VASHISHTA, University of Southern California, DAVID SINGH, University of Mis-souri, DAVID FRITZ, UWE BERGMANN, SLAC - Natl Accelerator Lab — We observed sub-picosecond dynamics of lattice vibration in MoSe₂ bilayer initiated by optical excitations at 800 nm and 400 nm, respectively, at high electron-hole plasma density. These photoinduced dynamics are probed by a delayed mega-electronvolt ultrafast electron diffraction (MeV-UED) that allows us to measure the conversion of electronic energy of carriers to in-plane lattice motion in real time. Corresponding ultrafast dynamics of lattice vibration is different from the irreversible inertial atomic acceleration model. Efficient electronic energy conversion to lattice motion signifies the possibility of light-induced approach for controllable temperature jump for future application in phase patterning of few-layered devices using transition metal dichalcogenides.

¹DOE-BES

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