Abstract Submitted
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Laser driven solid-state diffusional mixing in a Ni-Pt multilayer film probed by hard x-ray diffraction[1] AARON LOETHER, BRIAN KELLY, Department of Physics and Astronomy, University of Delaware, ANTHONY DICHIARA, ROBERT HENNING, Advanced Photon Source, Argonne National Laboratory, KARL UNRUH, MATTHEW DECAMP, Department of Physics and Astronomy, University of Delaware — Intense optical excitation has been utilized for decades to modify atomic scale structure in the condensed phase. When the optically excited systems are probed by hard x-ray radiation, one can reconstruct the modified atomic structure on a sub-angstrom spatial scale. In this work we utilize sub-picosecond optical radiation to rapidly drive atomic diffusion in a Ni-Pt multilayer film. Transient atomic diffusion was measured using hard x-ray diffraction, thereby directly observing the formation of a new metallic alloy as a function of laser excitation. Our observations demonstrate that the diffusional mixing in the multilayer can be completed in only a few individual laser shots, allowing us to directly probe the dynamics of the atomic scale motion.

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