

Abstract Submitted  
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**Coherent atomic motion in nano-crystal film**<sup>1</sup> JUNJIE LI, XUAN WANG, SHOUHUA NIE, RICHARD CLINITE, JIANMING CAO, Physics Department and National High Magnetic Field Laboratory, Florida State University — We report a theoretical study of the structural dynamics in metallic film in response to ultrafast laser heating. A two-dimensional model using a harmonic approximation is used to simulate the lattice thermal expansion dynamics in thin films. The results show that the surface shape and the orientations of nano-crystal grains are essential to determine the modes of lattice motions. Moreover, a large projection of coherent lattice oscillation in the in-plane direction is found, which was previously thought to be very small and was neglected in one-dimensional models. The simulation agrees well with our femtosecond electron diffraction measurements

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