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Reconstructing transient structural states from laser driven atomic diffusion in a metallic multilayer MATTHEW DECAMP, AARON LOETHER, JACQUES SAMAHA, KARL UNRUH, University of Delaware — Recent laser pump, x-ray probe measurements on metallic multilayer systems have demonstrated that it is possible to drive solid state diffusion in metallic systems with as little as one optical excitation pulse. However, reconstructing the spatially and temporally dependent concentration profile is non-trivial given the complex and dynamically changing forces that drive the atomic motion in these systems. In this work we present x-ray diffraction simulations to reconstruct the experimentally measured x-ray diffraction patterns of laser excited metallic multilayers. The resulting numerical fitting procedure retrieves the transient atomic concentration profile and lattice strain within the laser driven metallic multilayer.

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