

Abstract Submitted  
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**Ultrafast anisotropic strain in semiconductors measured by x-ray diffraction** D.A. WALKO, Argonne National Laboratory, SOOHEYONG LEE, Korea Research Institute of Standards and Science, E.C. LANDAHL, DePaul University, D.A. ARMS, Argonne National Laboratory — We have used time-resolved x-ray diffraction to probe the non-uniaxial properties of impulsive strains in ultrafast laser-excited III-V semiconductors. Transient shifts of x-ray rocking curves due to the strains are measured from three Bragg reflections whose scattering vectors range from perpendicular to the surface to nearly in plane. Time-dependent strain ellipsoids are then constructed, with a temporal resolution under  $\sim 150$  ps. We find that the strain consists not only of a longitudinal expansion along the surface normal, but it also includes slight compression along the transverse direction. We compare measurements for GaAs and InSb; their significant differences in electron diffusion rates allow us to distinguish between lattice and electronic effects. Supported by the U.S. Department of Energy.

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