

Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Powder X-ray Diffraction Using the Omega Laser JON EGGERT, RYAN RYGG, RAYMOND SMITH, MARINA BASTEVA, YUAN PING, RONNIE SHEPHERD, GILBERT COLLINS, LLNL — The past several years have seen dramatic improvements in dynamic ramp-compression experiments to measure stress-density using laser and pulsed-power drivers. Goals for future experiments center on achieving pressures over 1 TPa (10 Mbar), while keeping the samples in a solid phase and applying additional diagnostics to probe the nature of these states. X-ray scattering is a natural probe for such studies due to the copious x-ray energy produced by laser sources. Such experiments allow studies of the crystal structure, texture, strength, and possibly temperature of ramp-compressed solids at unprecedented density. With this in mind we have developed a powder x-ray diffraction diagnostic fielded at the Omega laser. We will report our results on ramp-driven iron, tin and copper. This work performed under the auspices of the U.S. DOE by LLNL under Contract DE-AC52-07NA27344.

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Date submitted: 17 Feb 2009

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