Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

On the Sensitivity of Transient Imaging Displacement Interferometry (TIDI) to Spall Damage Formation DARRIN BYLER, SCOTT GREENFIELD, DAVIS TONKS, SHENG-NIAN LUO, KENNETH MCCLELLAN, AARON KOSKELO, Los Alamos National Laboratory, PEDRO PERALTA, Arizona State University — We seek to develop experimentally-validated models for the microscopic dynamics of void nucleation and coalescence in polycrystalline copper. Our approach uses measurement of the dynamics of the breakout surface during laser-launched flyer experiments registered with specific points in a specimen's microstructure, and post-shot analysis of the shocked specimens. The dynamic measurement diagnostic suite includes TIDI, line- and point- VISARs. The components are spatially registered and time correlated to provide accurate information on the dynamics during the loading and release profile. Fiducials allow correlation with exact positions in the post-shot analysis of the target. TIDI movies of the breakout surface reveal complex dynamics during uniaxial shock loading of polycrystalline copper. Our goal is to extract the details of what occurs at the spall plane during void nucleation and coalescence. To test the diagnostic suite's sensitivity to processes occurring below the breakout surface, we have buried tungsten wires in single crystal copper at various depths and conducted shock loading experiments. This talk will focus on these experiments and code simulations used to study the sensitivity of our instrumentation to spall damage formation.

Aaron Koskelo
Los Alamos National Laboratory

Date submitted: 20 Feb 2009 Electronic form version 1.4