Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Dechirping analysis and calibration strategies for broadband laser ranging[1] MARYLESA HOWARD, JARED CATENACCI, National Security Technologies, MICHELLE RHODES, NATALIE KOSTINSKI, ADAM LODES, Lawrence Livermore National Laboratory — The precise location of surfaces and ejected particulates is inferred through the fielding and analysis of broadband laser ranging. This developmental diagnostic complements its predecessor, photonic Doppler velocimetry, and is appropriate for surfaces moving many kilometers per second, including movement that is non-normal to the probe. Light from a pulsed femtoseconds laser is reflected from the target surface and mixed with light from a reference leg, which is then passed through dispersive fiber, resulting in chirped beat signals at the detector. Within the analysis, the dispersed laser pulses require temporal remapping due to the nonlinear optical dispersion of the fiber. Various approaches, including minimizing FFT peak widths and estimating phase, are discussed here, along with their respective merits. In addition, techniques for data calibration are presented, focusing on in-situ calibration for dynamic experiments and what to do when all else fails.

[1]This work was done by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy. DOE/NV/25946–3135.

Marylesa Howard
National Security Technologies

Date submitted: 24 Feb 2017 Electronic form version 1.4