Broadband Laser Ranging for Position Measurements in Shock Physics Experiments 1 MICHELLE RHODES, COREY BENNETT, Lawrence Livermore Natl Lab, EDWARD DAYKIN, National Security Technologies, PATRICK YOUNK, Los Alamos Natl Lab, BRANDON LALONE, National Security Technologies, NATALIE KOSTINSKI, Lawrence Livermore Natl Lab — Broadband laser ranging (BLR) is a recently developed measurement system that provides an attractive option for determining the position of shock-driven surfaces. This system uses broadband, picosecond (or femtosecond) laser pulses and a fiber interferometer to measure relative travel time to a target and to a reference mirror. The difference in travel time produces a delay difference between pulse replicas that creates a spectral beat frequency. The spectral beating is recorded in real time using a dispersive Fourier transform and an oscilloscope. BLR systems have been designed that measure position at 12.5-40 MHz with better than 100 micron accuracy over ranges greater than 10 cm. We will give an overview of the basic operating principles of these systems.

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