Abstract Submitted for the SHOCK17 Meeting of The American Physical Society

Analysis of Error Effects Broadband Laser Ranging Systems<sup>1</sup> MICHELLE RHODES<sup>2</sup>, Lawrence Livermore Natl Lab, BRANDON LALONE, National Security Technologies, NATALIE KOSTINSKI, Lawrence Livermore Natl Lab, JARED CATENACCI, National Security Technologies, PATRICK YOUNK, Los Alamos Natl Lab, COREY BENNETT, 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. Analysis of BLR signals typically assumes a linear relationship between relative delay and measured beat frequency. However, we show that the beat frequency deviates from a linear relationship at large relative delays. This is one of several consequences of using long fiber lengths to perform an imperfect dispersive Fourier transform. We discuss implications of the shape of the frequency versus distance curve for the calibration of BLR systems and the accuracy of ranging measurements. We also discuss other contributions to error in BLR measurements and how to mitigate them.

<sup>1</sup>Prepared by LLNL under Contract DE-AC52-07NA27344, by LANL under Contract DE-AC52-06NA25396, and by NSTec Contract DE-AC52-06NA25946 <sup>2</sup>presenter

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Date submitted: 02 Mar 2017

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