Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Towards a final analysis of lateral gauge use across the stress ranges S.A. MCDONALD, Manchester X-ray Imaging Facility, School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL, United Kingdom., N.K. BOURNE, School of Materials, University of Manchester, Rutherford Appleton Laboratory, Didcot, Oxfordshire, OX11 0FA, United Kingdom., J.C.F. MILLETT, AWE, Reading, Aldermaston, RG7 4PR., Z, ROSENBERG, RAFAEL, Haifa, Israel. — The non-invasive measurement of in-material states of stress and strain within loaded targets is a paradigm that has yet to be achieved. However great advances have been made in achieving this goal over the past thirty years. Advances have come in several areas. Firstly the gauge element was redesigned from a grid configuration to a T shaped wire or foil. Secondly the flow around the gauge was investigated by several workers numerically and experimentally and shown to be stable and tracking vital changes in state faithfully. Finally a staged refinement of the analysis used to deconvolve the change in resistance back to stress has given a device now fit for use as a fiducial over the range of stresses up to the weak shock limit. This work allows examination of a series of features hitherto uncommented that have been noted on the response of the elements. One of these concerns the tracking of elastic-plastic transitions in target materials due to the rapid gauge response in the new geometry. Finally the parallel analysis of material strength using the deconvolution due to Asay has shown agreement and differences between the two techniques which are noted and reconciled here.

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Date submitted: 05 Feb 2015 Electronic form version 1.4