

Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Neutron Resonance Spectrometry Shock Temperatures in Molybdenum DAMIAN SWIFT, ACHIM SEIFTER, DAVID HOLTkamp, VINCENT YUAN, DAVID CLARK, WILLIAM BUTTLER, Los Alamos National Laboratory — Neutron resonance spectrometry (NRS) has been used to measure the temperature in Mo during shock loading, giving temperatures higher than expected. The effect of plastic flow and non-ideal projectile behavior were assessed. Plastic flow was estimated to contribute a temperature rise of 55K compared with hydrodynamic flow, and 100-150K on release, consistent with pyrometry measurements. Simulations were performed of the HE flyer system used to induce the shock in the Mo sample. The simulations predicted that the flyer was slightly curved on impact. The resulting spatial variations in load, including radial components of velocity, were predicted to increase the apparent NRS temperature by 160K. These corrections are sufficient to reconcile the apparent temperatures deduced using NRS with the accepted properties of Mo.

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Date submitted: 23 Feb 2007

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