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Inferring yield strength in α-phase cerium from a Ricthmyer-Meshkov Instability[1] FRANK CHERNE, BRIAN JENSEN, KYLE RAMOS, JOHN YEAGER, GUY DIMONTE, GUILLERMO TERRONES, MICHAEL PRIME, Los Alamos National Laboratory, KAMEL FEZZAA, APS, Argonne National Laboratory, CHARLES OWENS, Los Alamos National Laboratory — Recent experiments on the 12-mm gas gun known as IMPULSE at the Advanced Photon Source (Argonne, IL) were performed to examine Richtmyer-Meshkov instability (RMI) growth for cerium samples shocked into the α-phase. The high resolution images that have been obtained using X-ray phase contrast imaging show spike growth from a machined RMI surface with unprecedented spatial resolution (2-3 microns). Applying the theory developed by G. Dimonte, et al. [PRL **107** 264502 (2011)], we have inferred the yield stress for cerium which was shocked into the α-phase. We observed that the yield stress decreased as the melt boundary was approached similar to copper. Because the experiments were not performed using an ideal sinusoidal perturbation, molecular dynamics simulations and continuum calculations have been performed looking at the effect of the surface shape used in this work. In this work, a detailed discussion of the analysis will be presented along with a comparison of our calculations with available experimental data.

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