

Abstract Submitted  
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**Visualization of expanding warm dense gold and diamond heated uniformly by laser-generated ion beams** W. BANG, B.J. ALBRIGHT, P.A. BRADLEY, D.C. GAUTIER, S. PALANIYAPPAN, E.L. VOLD, M.A. SANTIAGO CORDOBA, C.E. HAMILTON, J.C. FERNÁNDEZ, Los Alamos Natl Lab — With a laser-generated beam of quasi-monoenergetic ions, a solid density target can be heated uniformly and isochorically. On the LANL Trident laser facility, we have used a beam of quasi-monoenergetic aluminum ions to heat gold and diamond foils. We visualized directly the expanding warm dense gold and diamond with an optical streak camera. Furthermore, we present a new technique to determine the initial temperatures of these heated samples from the measured expansion speeds of gold and diamond into vacuum. These temperatures are in good agreement with the expected temperatures calculated using the total deposited energy into the cold targets and SESAME equation-of-state tables at solid densities. We anticipate the uniformly heated solid density target will allow for direct quantitative measurements of equation-of-state, conductivity, opacity, and stopping power of warm dense matter, benefiting plasma physics, astrophysics, and nuclear physics. \*This work is sponsored by the LANL LDRD Program.

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