Abstract Submitted
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Kinetics of the Phase Transitions in Zr at Ultra High Strain Rates[1] H. B. RADOUSKY, M. R. ARMSTRONG, P. V. GRIVICKAS, J. C. CROWHURST, J. M. ZAUG, R. A. AUSTIN, J. L. BELOF, Lawrence Livermore National Laboratory — Zirconium is an excellent material in which to study the kinetics of pressure induced phase transitions. In particular it has a low pressure structural transition near 7 GPa and a higher pressure transition near 35 GPa. We have obtained velocimetry data from micron-thick zirconium films which span this pressure range using our ultrafast laser shock platform to measure the free surface velocity time histories at breakout, and wave arrival times at different film thicknesses. In this study, we have explored using both shock and ramp compression of zirconium at strain rates in the regime up to and above 10^9 s-^{1}. The targets consisted of both zirconium films deposited directly on glass slides and on different thickness of aluminum. These experimental results have been coupled with modeling and simulation, which allows analysis of the surface histories using a method that accounts for non-steady wave propagation and time-dependent material behavior.

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