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Molecular modeling of high-pressure ramp waves in tantalum J. MATTHEW D. LANE, HOJUN LIM, Sandia National Laboratories, JUSTIN L. BROWN, Sandia National Labs — Ramp wave compression experiments of bcc metals under extreme conditions have produced differing measurements of material strength response. These variations are often attributed to differing experimental techniques, and varying material factors such as microstructure, and strain-rate. We present non-equilibrium molecular dynamics simulations of tantalum for single crystal and two polycrystalline nanostructures out to 250 GPa, over strain states ranging from 10^8 to 10^{11} 1/s. Results will be compared to recent Z-machine strength experiments, meso-scale crystal plasticity models and continuum-scale polycrystalline model. Sandia National Laboratories is a multi program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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