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Kinetic effects in the deformation of High-Pressure Low-Temperature States[1] RAYMOND SMITH, Lawrence Livermore Nat'l Lab. — Recent experiments have demonstrated the production and propagation of high stress ramp-waves that result in quasi-isentropic compression of condensed materials. We have discovered that for materials at high pressures kinetic effects play a pivotal role in determining the pressure onset of plastic flow and the transformation pressure for structural phase transitions. These time-dependent effects seem to be universal to all materials we have studied. However, the compression rate at which kinetic effects dominate is found to be very material dependent. We will present recent results on Bi, Fe and Si taken on the Janus and Omega laser facilities. In addition, we also describe recent results using a new two-dimensional velocimeter to study deformation mechanisms in materials under ramp compression.

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