

Abstract Submitted
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Ion Beam Driven Warm Dense Matter Experiments¹ F.M. BIENIOSEK, E. HENESTROZA, M.A. LEITNER, S.M. LIDIA, B.G. LOGAN, R.M. MORE, P.A. NI, P.A. SEIDL, W.L. WALDRON, LBNL, J.J. BARNARD, LLNL — We report plans and experimental results in ion beam-driven warm dense matter (WDM) experiments. Initial experiments use a 0.3 MeV K⁺ beam from the NDCX-I accelerator. The WDM conditions are to be achieved by longitudinal and transverse neutralized drift compression to provide a hot spot on the target with a 1-mm beam spot size, and 2-ns pulse length. As a technique for heating matter to high energy density, intense ion beams can deliver precise and uniform beam energy deposition, in a relatively large sample size, and can heat any solid-phase target material. The range of the beams in solid targets is less than 1 micron, which can be lengthened by using reduced density porous targets. We have developed a WDM target chamber and target diagnostics including a fast multi-channel optical pyrometer, optical streak camera, VISAR, and high-speed gated cameras. Initial experiments will explore measurement of temperature and other target parameters. Experiments are planned in areas such as dense electronegative targets, porous target homogenization and two-phase equation of state.

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