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Probing the Metastability Limit of Liquid Water under Dynamic Compression[1] MICHELLE MARSHALL, University of Rochester, MARIUS MILLOT, DAYNE FRATANDUONO, PHILIP MYINT, JON BELOF, JON EGGERT, YONG-JAE KIM, RAY SMITH, JIM MCNANEY, Lawrence Livermore National Laboratory, DANE STERBENTZ, UC Davis — Kinetics can play an important role in the transformation of materials to different high-pressure phases on the short time scales associated with dynamic-compression experiments. The study of phase-transition kinetics has motivated many theoretical and experimental works on the rapid freezing of liquid water into the ice-VII phase. We present measurements of the over-pressurization of the water-ice VII phase transition at 10x higher compression rates than previously studied. Water was ramp compressed to peak pressures of ∼15 GPa over ∼10 ns at the Omega laser facility. The pressure at which water froze into the ice VII phase is deduced from wave-profile measurements and compared to predictions using a phase-transition-kinetics model recently developed at Lawrence Livermore National Laboratory.

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