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Double shocks on precompressed deuterium near the plasma phase transition STEPHANIE BRYGOO, CEA, MARIUS MILLOT, LLNL, PAUL LOUBEYRE, CEA, PETER CELLIERS, LLNL, GILBERT COLLINS, LLE, JON EGGERT, LLNL, RYAN RYGG, LLE, DAMIAN SWIFT, LLNL, RAYMOND JEANLOZ, UC Berkeley — Despite extensive theoretical and experimental studies in the past decades, the high pressure properties of fluid hydrogen remain not very well understood in the vicinity of the predicted Plasma Phase Transition (100 to 300 GPa, 1000 to 3000 K). In particular there is a controversy of the location of the appearance of conducting/reflecting state of hydrogen. Measurements have been based up to now on laser heated static DAC and multishocks on cryo-D2. Here we present new experimental data in this regime using a combination of static precompression of deuterium to 6-12 GPa followed by double shocks up to 100-200 GPa. Analysis of the optical properties provide access to compressed deuterium electronic properties and suggest the onset of metallic-like conductivity around 200 GPa below 2000 K, in agreement with recent measurements with reverberation compression at the National Ignition Facility[1] but in contrast with experiments at the Z facility[2]. Part of this work was performed at LLNL under Contract DE-AC52-07NA27344.
[1] Celliers et al, APS-SCCM 2017 [2] Knudson, M. D. *et al. Science* 348**,** 1455–1460 (2015). LLNL-ABS-725307

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