# Investigating the insulator to metal transition in dense fluid hydrogen with laser-driven dynamic compression

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Despite extensive theoretical and experimental advances in the past decades, the properties of fluid hydrogen remain challenging to understand in the vicinity of the predicted first-order insulator-to-metal (IM) transition - also known as the plasma phase transition (PPT). In particular, there are apparent discrepancies between different experimental platforms and techniques regarding the character and the thermodynamic states at which the insulator-to-metal transition is observed to occur.

We will describe two new experiments employing laser-driven dynamic compression to create and diagnose high pressure, low entropy states of dense fluid hydrogen. We will report the results of experimental campaigns at the National Ignition Facility and at the Omega Laser Facility that span the IM transition with different dynamic compression schemes and discuss their implications for our understanding of the metallization of dense fluid hydrogen for planetary, astrophysical and high energy density science.

Part of this work was performed at LLNL under Contract DE-AC52-07NA27344.