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**Developing absolute shock wave equation of state measurements on
the NIF**

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The National Ignition Facility provides an unprecedented capability to generate ultra-high pressure planar shock waves (around 10 TPa) in solid samples. We are currently fielding impedance match equation of state experiments to determine the shock Hugoniot of various samples relative to EOS standards, such as aluminum and quartz. However, the equations of state of the shock EOS standards at multi-TPa shock pressures are not yet well-established. Absolute techniques are needed to provide the data needed to establish the Hugoniots of the standards, and also to measure the state of a sample directly. We are pursuing several approaches to defining shock EOS standards using absolute techniques. These approaches will be discussed. This work was performed under the auspices of the U.S. Department of Energy by LLNL under contract DE-AC52-07NA27344.

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