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Laser-Shock Compression and Hugoniot Measurements of Liquid Hydrogen TAKAYOSHI SANO, Osaka University, NORIMASA OZAKI, TATSUHIRO SAKAIYA, KEISUKE SHIGEMORI, MASAHIRO IKOMA, TOMOAKI KIMURA, KOHEI MIYANISHI, TAKASHI ENDO, AKIYUKI SHIROSHITA, HIDEKI TAKAHASHI, TATSUYA JITSUI, YASUNORI HORI, YOICHIRO HIRONAKA, AKIFUMI IWAMOTO, TOSHIHIKO KADONO, MITSUO NAKAI, TAKUO OKUCHI, KAZUTO OTANI, KATSUYA SHIMIZU, TADASHI KONDO, RYOSUKE KODAMA, KUNIOKI MIMA — Hugoniot data for liquid hydrogen were obtained up to 55 GPa under laser-driven shock loading using impedance matching to a quartz standard. The pressure range we achieved is about 5 times higher than the earlier experiments done by a two-stage gas gun. The experiment was performed on the Gekko/HIPER laser facility at the Institute of Laser Engineering, Osaka University. A significant improvement in the precision of velocity measurements because transparent standard allows direct measurement of the shock velocities for both the standard and hydrogen. The shocked temperature of hydrogen is determined concurrently from the brightness temperature. The temperature is $\sim$ 9000 K at 40 GPa, which is about twice as high as that of shocked deuterium at the same pressure. Compression and temperature along the primary Hugoniot are consistent with theoretical models of equation-of-state.

Takayoshi Sano
Osaka University

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