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**Absolute equation-of-state measurements for an important metal**
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Aluminum is one of the most important metals in many scientific scenes. In the research fields of high-pressure physics, the metal plays a crucial role as the standard material of equation-of-state (EOS). Since Al EOS is known well up to GPa regime, the impedance matching method is fairly useful. However, above TPa pressures, the Al EOS even the principle Hugoniot is uncertain. As it is impossible for the conventional drivers to achieve the pressure conditions, theoretical models have not been experimentally validated. This limits the use of Al for the impedance matching method in TPa pressure regions. In this paper, aluminum EOS experiments at the GEKKO/HIPER laser facility of the Institute of Laser Engineering are presented. The Hugoniot were absolutely measured using a side-on x-ray backlighting diagnostic. From the shock and pusher (particle) velocities, the Hugoniot EOS points were determined up to multi-TPa pressures. This laser-driven EOS experimental scheme can provide new absolute EOS data of any opaque materials previously inaccessible in the conventional pressure drivers, helping to establish EOS standard materials at higher pressures.

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