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Characterization of laser-produced strongly coupled plasma with density and temperature relevant to solar photosphere

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We report a study of laboratory plasmas with density (n_e) and temperature (T_e) close to those of solar chromosphere and photosphere. The dense plasmas produced in supercritical fluids [Nature Commun. 12, 4630 (2021)] by ns laser pulse show blackbody emission spectra, which gives $T_e \sim 1$ eV. The Saha equation modified by ionization potential depression gives $n_e 10^{21} \text{ cm}^{-3}$, implying that the ions and electrons are strongly coupled with the Coulomb coupling parameter larger than unity [Plasma Phys. Control. Fusion 64, 095010 (2022)]. Our study paves a way to investigate the physics of strongly coupled plasmas and help understand the dynamics events in solar surface and atmosphere. * The work is supported by the National Research Foundation of Korea under grant No. RS-2024-00349684.

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