

Laboratory generation and observation of super-Earth's interior using high-power laser

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We reports the first laboratory generation of super Earth planet interior states. We focused a high-power laser pulse onto a water target, thereby dynamically compressing the water to pressures to ~100-200 GPa. Our pressure-volume-temperature equation-of-state data are in good agreement with water-world super Earth GJ1214b interior conditions predicted by first principle calculations. Simultaneous optical reflectivity measurements also show that the warm dense water behave as an electronically conducting fluid capable of generating a significant magnetic field. This high-power laser experiment is an important step toward understanding the interior structure of super Earths, which can provide a clue for understanding a scenario for formation of the exoplanetary systems.

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