

# Compressed diamond sheds light on mega-planets

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The night sky over the river Havel in Guelpe, northeastern Germany, on February 23, 2014

Physicists in the United States on Wednesday reported they had compressed diamond to a density greater than that of lead, a technical feat that yields insights into the secrets of giant planets.

Diamond is the hardest, strongest form of carbon on Earth and the least

compressible material known.

A tiny synthetic sample of it was bombarded with 176 [laser beams](#), creating pressure waves that progressively squeezed the sample to nearly four times its normal density, the scientists reported in the journal *Nature*.

In the 20-nanosecond operation, the diamond was exposed to pressure of five terapascals, equivalent to 50 million times the pressure of the atmosphere at Earth's surface or 14 times the pressure at its core.

Scientists used the world's largest laser, a two-megajoule device housed at the National Ignition Facility at the Lawrence Livermore National Laboratory in California.

Designed to carry out experiments in nuclear fusion, the laser can focus on a millimetre- (0.04-inch-) sized target held at the centre of a 10-metre (32.5 feet) sphere.

The laser's sci-fi setting was used by the makers of the movie "Star Trek Into Darkness" as the backdrop for the "warp core" of the starship Enterprise.

The exploit—equivalent to simulating pressures at the core of Saturn—should help astrophysicists finetune estimates of the process that make stars and [giant planets](#), formed by strong gravitational pressures that crushed their atoms together.

More than a thousand planets have been discovered outside our Solar System, many of them far bigger than Jupiter, the biggest planet of our star system.

**More information:** Ramp compression of diamond to five terapascals,

*Nature*, [www.nature.com/nature/journal/...ull/nature13526.html](http://www.nature.com/nature/journal/...ull/nature13526.html)

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