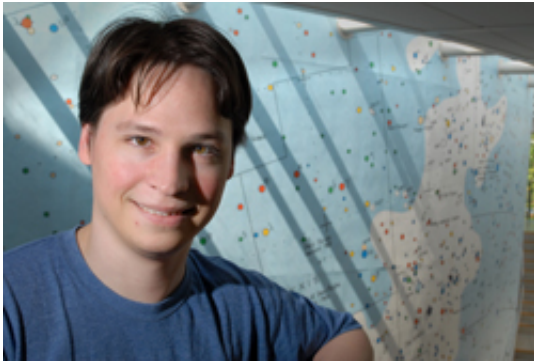


# Several Jupiter sized planets found to have only weak Earth like gravity

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Astrophysicists at the University of Warwick have found that several Jupiter sized gas giants beyond our solar system have surface gravities much closer in strength to Earth than the intense gravity of Jupiter.

The University of Warwick team , Dr John Southworth, Dr Peter Wheatley and Giles Sams are the first people to calculate accurate measures of the surface gravity of all 14 known gas giant planets beyond our solar system that can be observed transiting (moving across the face of) their star.

They created a new method which enabled the Warwick researchers to deduce the surface gravity of all 14 of these gas giants using a technique which is both simpler and ten times more accurate than an older method

that had only produced a rough estimate for just one of the gas giants - HD 209458.

All but one of these 14 known gas giant planets that can be seen transiting their star have a planetary radius bigger than Jupiter. Intriguingly the one older surface gravity estimate available, for HD 209458, suggested it had a surface gravity of only  $9.43$  to  $9.7 \text{ ms}^{-2}$ . Despite being bigger than Jupiter this would give it a surface gravity closer to Earth's at  $9.8 \text{ ms}^{-2}$  or our own solar system's smaller gas giants (Saturn  $8.96 \text{ ms}^{-2}$ , Uranus  $8.69 \text{ ms}^{-2}$  and Neptune  $11.15 \text{ ms}^{-2}$ ) rather than Jupiter at  $24.79 \text{ ms}^{-2}$ .

On carrying out their more accurate measurement of all 14 of these gas giants the Warwick team have discovered that the surface gravity of HD 209458 is not an anomaly. Despite all but one of the gas giants (HD 149026) being bigger than Jupiter all but one of them turned out to have surface gravities that are much lower than Jupiter's. Only OGLE-TR-113 was found to have a surface gravity higher than Jupiter's.

In fact they found that 4 of these planets actually have surface gravities close to or lower than that of Earth's or our own solar system's "smaller" gas giants rather than Jupiter's much more intense gravity. A further 4 had surface gravities around half to two thirds that of Jupiter's. For the planet for which there was already a rough estimate of surface gravity (HD209458b) they actually found an even lower surface gravity of  $9.28 \text{ ms}^{-2}$  (error factor of plus or minus  $0.15 \text{ ms}^{-2}$ ).

University of Warwick researcher John Southworth said: "This research gives us a sense of the sheer variety of types of planet to be found beyond our Solar System. An understanding of the surface gravity of these worlds also gives us a clearer picture of the rate of in the evaporation of planetary atmospheres."

Full paper online at [uk.arxiv.org/PS\\_cache/arxiv/pdf/0704/0704.1570v1.pdf](https://arxiv.org/abs/0704.0704)

Source: University of Warwick

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