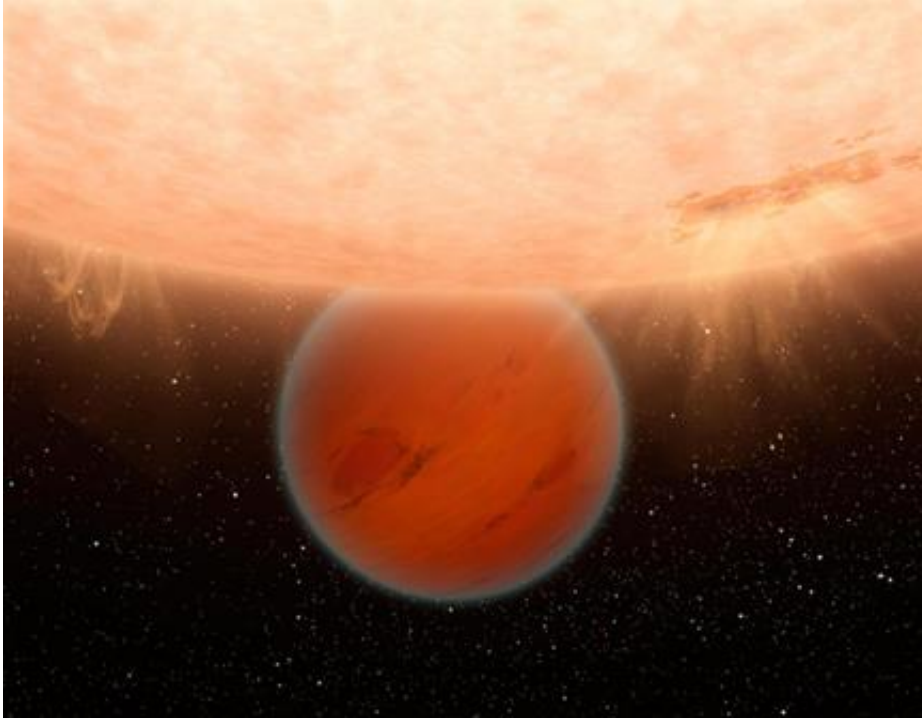


# Small planets hiding in giant cloaks

June 15 2016

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An artist's illustration of a hot Neptune-sized world moving behind its host star.  
Credit: NASA / JPL-Caltech

Hazes and clouds high up in the atmospheres of exoplanets may make them appear bigger than they really are, according to new research by astronomers at the Space Research Institute (IWF) of the Austrian Academy of Sciences. The team, led by researcher Dr Helmut Lammer, publish their results in a letter to *Monthly Notices of the Royal Astronomical Society*.

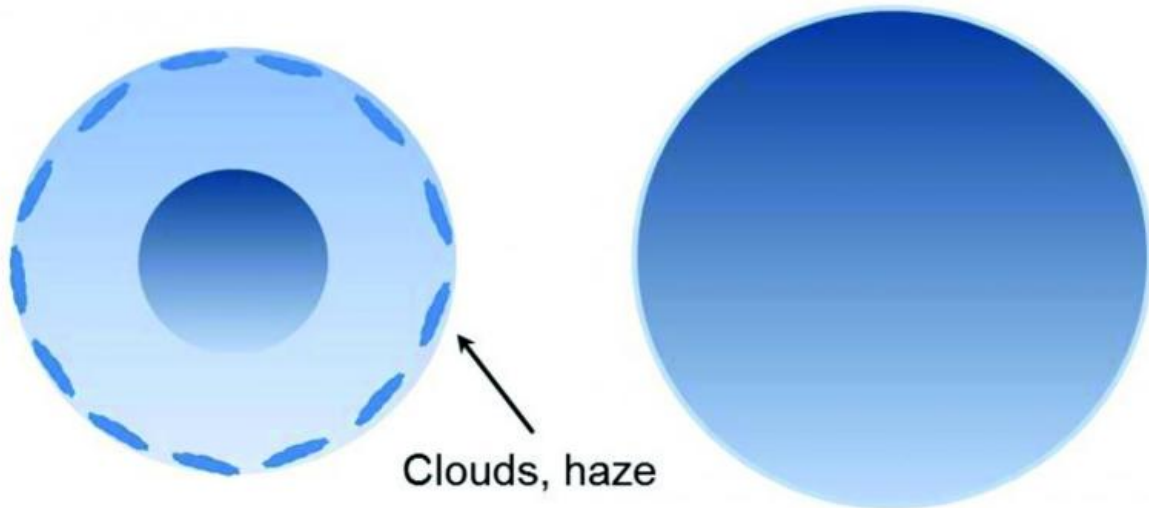
Since the first confirmed discovery in 1993, astronomers have found more than 3,000 [planets](#) in orbit around stars other than our Sun. A key goal now is to characterise known worlds by mass, size and composition, to better understand the evolution of planetary systems, and the prospects for 'Earthlike' planets that might support life.

In 2014 Lammer and his team used the European Space Agency (ESA) CoRoT space telescope to study the [upper atmosphere](#) of two low-mass planets that are regularly seen to pass in front of (transit) the star they orbit. The two planets orbit their star in 5 and 12 days, appear to be around 4 and 5 times the diameter of the Earth, and have respective masses of less than 6, and 28 times Earth. The outer, more [massive planet](#), CoRoT-24c, is similar in mass to Neptune. In contrast, the inner planet, CoRoT-24b, is less than a quarter as massive, but is similar in size, so seems to have a very low density.

With such short orbits, both worlds are close to and will experience dramatic heating from the star. The team modelled this and found that the lower mass planet would see its [atmosphere](#) evaporate within 100 million years, if it really is as big as suggested. But the star is billions of years old, so the planet should have lost its atmosphere long ago.

CoRoT-24b

CoRoT-24c



Mass less than around 5.7 Earths

Mass around 28 Earths

A diagram of a the hot low-mass extended atmosphere with cloud deck and haze, around the exoplanet CoRoT-24b (left), compared to the cooler, more massive, and compact CoRoT-24c (right). Credit: IWF/Lammer

he solution seems to be that the planet is only about half as big as thought. Lammer argues that an extended, very thin, atmosphere, surrounds a relatively compact planet, but has high altitude features that confuse observations. He explains: "The radius is based on what we see when the planet makes its transit. This is probably distorted by clouds and haze high in the atmosphere, in a region where atmospheric pressure is otherwise very low."

Co-author Luca Fosseti adds that this effect needs to be considered by future exoplanet missions, like the ESA CHaracterising ExOPlanets

Satellite (CHEOPS) mission due to launch in December 2017. Results for some worlds found by the NASA Kepler observatory may also need to be re-evaluated.

"Our results show that CHEOPS scientists need to be cautious about their first measurements", says Fossati.

"Since Kepler has also discovered several similar low-density and low-mass planets, it is very likely that the size measured for many of them also differ from the true value, so there could be a bias in the results."

If the Austrian team are right, this has dramatic implications, for example in the studies of planet populations and how the mass of planets relate to their size.

**More information:** "Identifying the "true" radius of the hot sub-Neptune CoRoT-24b by mass loss modelling", H. Lammer, N.V. Erkaev, L. Fossati, I. Juvan, P. Odert, E. Cubillos, E. Guenther, K.G. Kislyakova, T. Lüftinger, M. Güdel, *Monthly Notices of the Royal Astronomical Society*, in press. [mnrsl.oxfordjournals.org/cont ... rasl.slw095.abstract](https://mnrsl.oxfordjournals.org/cont...rasl.slw095.abstract)

Provided by Royal Astronomical Society

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