New Earth-like exoplanets discovered around red dwarf Teegarden star

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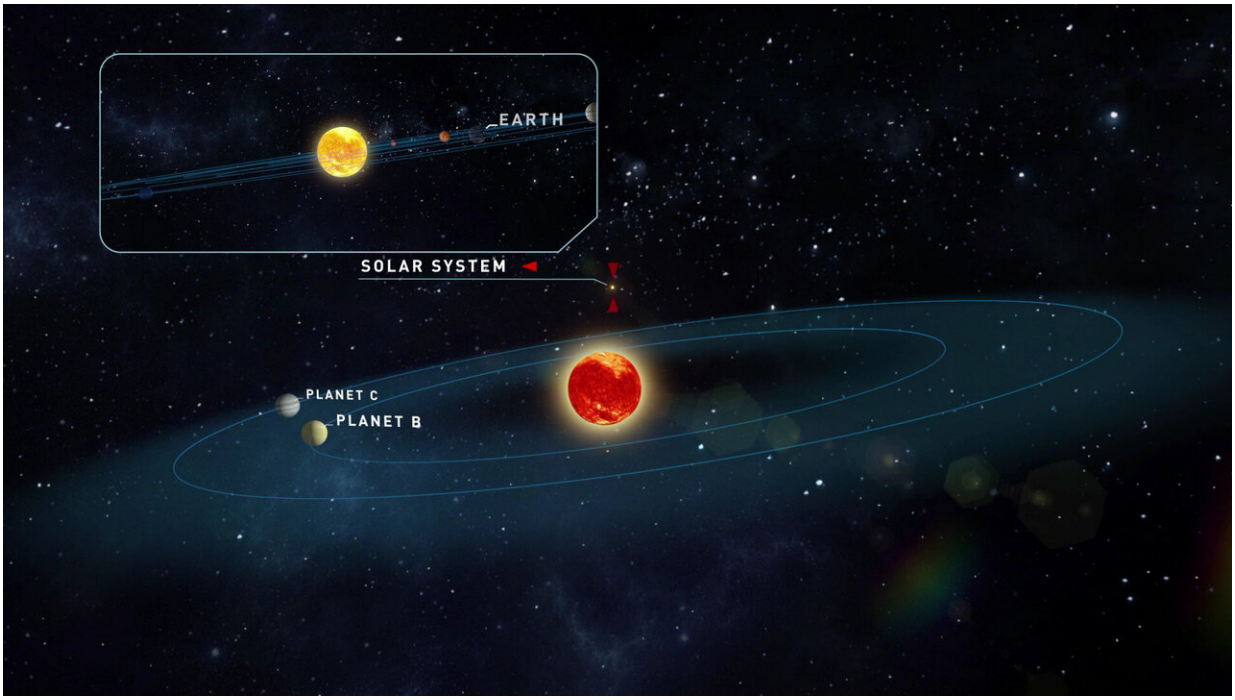


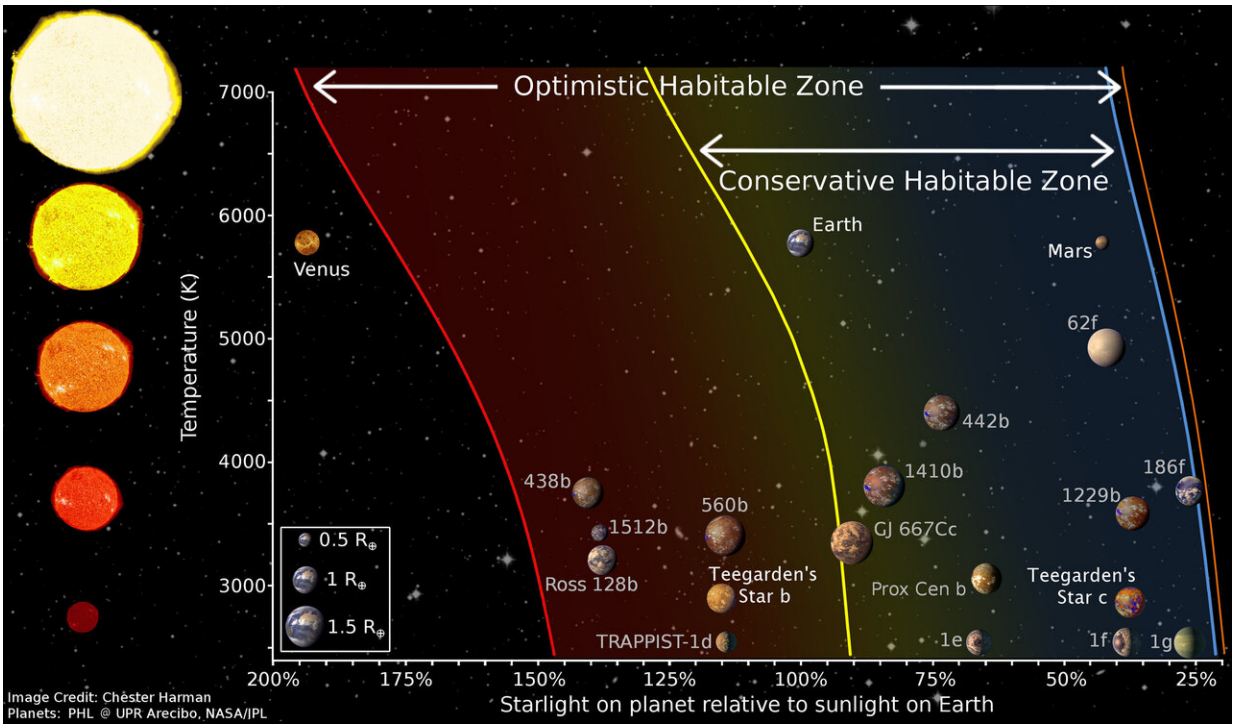
Credit: Instituto de Astrofísica de Canarias

An international team led by the University of Göttingen (Germany) with participation by researchers from the Instituto de Astrofísica de Canarias (IAC) have discovered, using the CARMENES high-resolution spectrograph at the Calar Alto Observatory (Almería) two new planets like the Earth around one of the closest stars within our galactic neighbourhood.

The Teegarden star is only 12.5 light years away. It is a red dwarf in the direction of the constellation of Aries. Its surface temperature is 2,700 degrees C, and its mass is only one-tenth that of the sun. Even though it is so near, its faintness impeded its discovery until 2003.

"We have been observing this star for three years to look for periodic variations in its velocity, explains Mathias Zechmeister, a researcher at the University of Göttingen, the first author of the paper. The observations showed that two planets are orbiting it, both of them similar to the planets in the inner part of the Solar System. They are just a little bigger than the Earth and are situated in the "inhabitable zone" where water can exist as a liquid. "It is possible that the two planets are part of a larger system," says Stefan Dreizler, another University of Göttingen researcher and a co-author of the paper.

Photometric campaigns on this star have been carried out with instruments such as Muscat2 on the Carlos Sánchez Telescope at the Teide Observatory (Tenerife), and with the network of telescopes of the Las Cumbres Observatory, among others. These studies demonstrate that the signals of the two planets cannot be due to the activity of the star, even though we could not detect the transits of the two new planets," says Victor Sánchez Béjar, an IAC researcher and another author of the article which is being published in the journal *Astronomy and Astrophysics*.



Credit: Instituto de Astrofísica de Canarias

For the transit method to be viable, the planets must pass across the face of the stellar disc and block some of the light from the star during a short time, which means that it must lie on a line joining the sun and the Earth. This lucky alignment occurs for only a small fraction of planetary systems.

Planet hunters

The type of star to which the Teegarden star belongs consists of the smallest for which researchers can measure the masses of their planets with current technology. "This discovery is a great success for the CARMENES project, which was designed to look for planets around low mass stars," says Ignasi Ribas, a researcher at the Institut d"Estudis

Espacials (IEEC) of Catalonia and a co-author of the article.

Since 2016, German and Spanish scientists have been searching for planets around nearby stars using CARMENES, which is on the 3.5m telescope of the Calar Alto Observatory (Almería) These new planets are the 10th and 11th discovered by the project.have been carried out with instruments such as Muscat2 on the Carlos Sánchez Telescope at the Teide Observatory (Tenerife), and with the network of telescopes of the Las Cumbres Observatory, among others. These studies have allowed us to show that the signals of the two planets cannot be due to the activity of the star, even though we could not detect the transits of the two new planets" comments Victor Sánchez Béjar, an IAC researcher and another author of the article which is being published in the journal *Astronomy and Astrophysics*.

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More information: M. Zechmeister et al. The CARMENES search for exoplanets around M dwarfs. Two temperate Earth-mass planet candidates around Teegarden's Star, *Astronomy & Astrophysics* (2019). DOI: 10.1051/0004-6361/201935460

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