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PRESS RELEASE

A CAB-led team discovers the "most habitable" planet found to date

A recent study, led by the Centro de Astrobiología (CAB), CSIC-INTA, reports the discovery of the best candidate to date to search for life outside the Solar System. The planet has an equilibrium temperature compatible with the presence of liquid water, and it orbits every 54 days a star cooler than the Sun, but without the problems that planets in the habitable zone of red dwarfs have.

04-12-2025

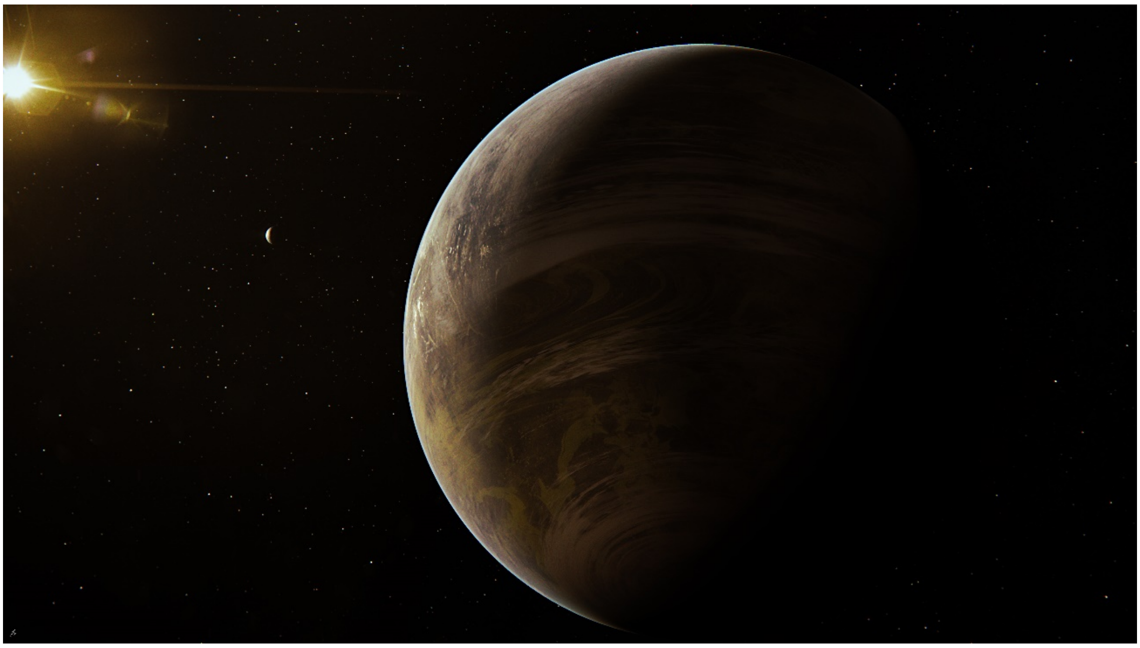
An international team led by the Centro de Astrobiología (Spain) has discovered the best candidate to date to search for life in an extrasolar planet. The team analyzed data from the NASA space telescope TESS, and the instrument CARMENES on the 3.5m ground-based telescope in Calar Alto (Almería, Spain) to measure the size and mass of TOI-2093 c. The team also used data from four ground-based observatories to understand better the TOI-2093 planetary system, composed by at least two planets, one of which, TOI-2093 c, has an equilibrium temperature compatible with the presence of liquid water. The planet is the smallest found to date in the so called "habitable zone" of a solar-like star (those of type F, G or K).

When a planet transits in a close orbit to its parent star it tends to rotate at the same pace as it orbits the star, yielding a situation in which the planet always faces the star with the same side, similar to the Moon-Earth system ("tidal-locking"). This makes more unlikely the development of life in those planets. Alike planets in the habitable zone of red dwarfs (or M-type stars), TOI-2093 c is not expected to suffer from "tidal-locking" with its star (a K5V type).

About two dozens of planets well characterized (i.e., with known mass and radius) have been discovered to lie in the habitable zone of solar-like stars, but all of them are much bigger than TOI-2093 c, imposing more difficulties to the development of life, like an excess of atmospheric pressure, or other effects linked to planet gravity. Although TOI-2093 c is still over twice the size of the Earth, and its gravity is three times higher, its composition is likely more similar to that of a planet as dense as the Earth.

Further observations of its planet atmosphere may give more clues on the actual habitability of this planet in the future.

More information



Artistic impression of planets TOI-2093 c (foreground) and b (background to the left). *Credits*: Ignacio de la Calle.

Scientific article in Astronomy & Astrophysics

"**A planetary system with a sub-Neptune planet in the habitable zone of TOI-2093**", Sanz-Forcada et al. (2025), A&A 703, A93

https://www.aanda.org/articles/aa/full_html/2025/11/aa56361-25/aa56361-25.html

DOI: 10.1051/0004-6361/202556361

Contact

CAB researchers:

Jorge Sanz Forcada, jsanz@cab.inta-csic.es

Esther González Álvarez, egonzalez@cab.inta-csic.es

FUNDING

Project No. PID2022-137241NB-C42 funded by MCIN/ AEI /10.13039/501100011033/ y por FE-DER Una manera de hacer Europa

About CAB

The Centro de Astrobiología (CAB) is a joint research center of INTA and CSIC. Created in 1999, it was the first center in the world dedicated specifically to astrobiological research and the first non-US center associated with the NASA Astrobiology Institute (NAI), currently the NASA Astrobiology Program. It is a multidisciplinary center whose main objective is to study the origin, presence, and influence of life in the universe through a transdisciplinary approach. In 2017, the CAB was awarded by the Ministry of Science and Innovation as a "María de Maeztu" Unit of Excellence.

The CAB has led the development of the REMS, TWINS y MEDA instruments, operational on Mars since August 2012, November 2018, and February 2021, respectively; as well as the science of the RLS and RAX Raman instruments, which will be sent to Mars at the end of this decade as part of the ExoMars mission and to one of its moons in the MMX mission, respectively. In addition, it is developing the SOLID instrument for the search for life in planetary exploration. The CAB also co-leads, together with three other European institutions, the development of the PLATO space telescope, and participates in various missions and instruments of great astrobiological relevance, such as MMX, CARMENES, CHEOPS, BepiColombo, DART, Hera, the MIRI and NIRSpec in JWST, and the HARMONI in ESO's ELT (Extremely Large Telescope).

UNIDAD DE CULTURA CIENTÍFICA DEL CAB

divulgacion (+@cab.inta-csic.es); (+34) 915202107