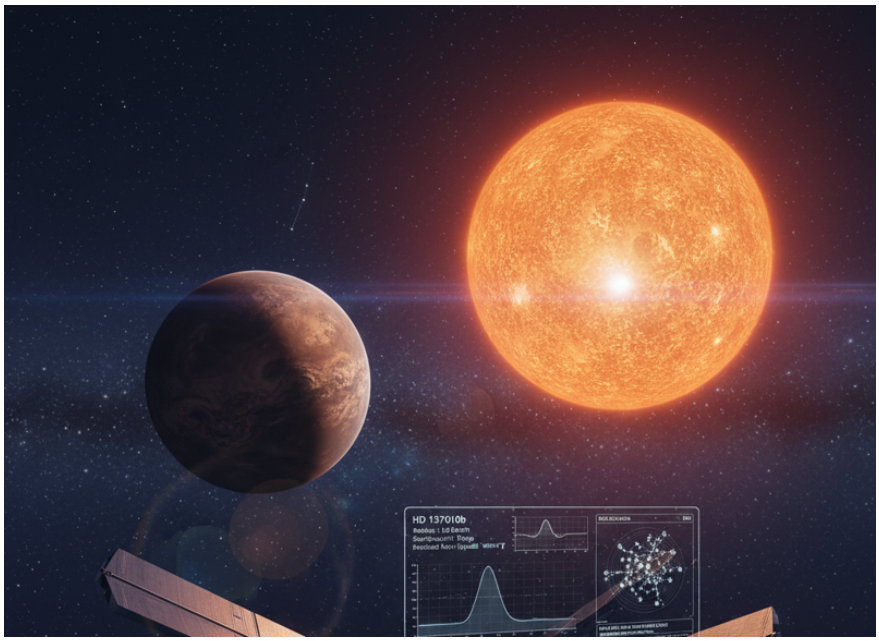
A cold 'copy' of Earth has been found in a nearby star system.

A planet, HD 137010b, discovered orbiting a K-type dwarf star, is 6% larger than Earth and has the potential to sustain an atmosphere and life.

Astronomers have just discovered a new exoplanet orbiting a K-dwarf star, named HD 137010. This discovery was made after scientists noticed a single, very shallow **transit** signal in the archives from NASA's Kepler Space Telescope's K2 Extended mission.

This exoplanet, designated **HD 137010b** , is estimated to be only about 6% larger than Earth. However, its surface temperature is comparable to Mars – potentially dropping below -70°C.

Characteristics of the host star HD 137010



HD 137010 is a K3.5V dwarf star located approximately 146 light-years from us in the constellation Libra.

1. **Age:** Estimated to range from 4.8 to 10 billion years.
2. **Activity:** Low magnetic activity indicates that this is an old and relatively stable star.

3. **Brightness:** With an apparent magnitude of 10.1, this is one of the brightest known stars possessing an Earth-sized planet with moderate orbital characteristics.

The difference compared to previous findings.

During Operation K2 15 in 2017, the Kepler telescope observed this star continuously for nearly three months.

Alexander Venner, an astronomer at the University of Southern Queensland and lead author of the study, said: *"Most Earth-sized planets previously found in **the habitable zone** orbit red dwarfs – a type of star that is much smaller and dimmer than our Sun."*

He further explained that scientists are concerned that high-energy radiation from red dwarf stars could blow away the planet's entire atmosphere, rendering it unsustainable for life. Conversely, the host star HD 137010 has properties closer to the Sun, giving planet HD 137010b a higher probability of maintaining an atmosphere according to current theoretical models.

Analysis and verification process

To determine the nature of this approximately 10-hour transit signal, Dr. Venner and colleagues meticulously examined data from K2, starlight curves, archived images, **radial velocity** measurements , and astrometric data.

The test results confirmed that this signal originated from the target star itself and had an astrophysical origin, rather than being caused by background noise, a nearby occultation by a binary star system, or an object in the solar system.

Physical specifications of HD 137010b

Based on the depth of the transit signal and the characteristics of the host star, astronomers have calculated:

1. **Radius:** Approximately 1.06 times that of Earth.
2. **Orbital period:** Estimated to be approximately 355 days (roughly one year on Earth).
3. **Energy received:** This planet receives only about 29% of the stellar radiation that Earth receives from the Sun. This places it on the outer edge of the habitable zone around a star.

Dr. Venner stated: *"If HD 137010b has an atmosphere similar to Earth or Mars, it could be colder than even the South Pole. However, if the atmosphere is thicker, it could warm the planet enough to sustain liquid water – a potential environment for life."*

Future vision

Although current astronomical instruments cannot yet fully analyze the characteristics of this new planet, it will be a top target for next-generation radial velocity sensors in the search for an "Earth-like" planet.

Future space missions designed to directly image Earth-like planets, such as NASA's **Habitable Worlds Observatory** , may also capture actual images of HD 137010b.

This discovery has been officially published in the prestigious scientific journal *Astrophysical Journal Letters* .