



Habitable-Zone Planet Finder

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Why in News

The Habitable-zone Planet Finder (HPF) has confirmed its first planet (**exoplanet**) called G 9-40b, orbiting a nearby low mass bright **M-dwarf star** (100 light years from Earth) with an orbital period of 6 Earth-days.

Earlier, **NASA's Kepler mission** had observed a dip in the host star's light, suggesting that the planet was crossing in front of the star during its orbit. To confirm the HPF was used.

Key Points

- **G 9-40b:** G 9-40b is amongst the top 20 closest transiting planets known.

- **Habitable-zone Planet Finder** : HPF is an **astronomical spectrograph**, built by Penn State University scientists, and recently installed on the 10m **Hobby-Eberly Telescope** at McDonald Observatory (US).
 - The HPF searches for **exoplanets** by using the **Doppler effect**.
 - A spectrograph is an instrument that splits light into its component wavelengths. Scientists measure the properties of light over a specific portion of the spectrum, and draw conclusions on what is responsible for the trends they observe.
 - The HPF provides the **highest precision measurements of infrared signals from nearby low-mass stars**, and astronomers use it to validate the candidate planet by excluding all possibilities of contaminating signals to a very high level of probability.
 - It is designed to detect and characterise planets in the habitable-zone also known as '**Goldilocks zone**'- **the region around the star where a planet could sustain liquid water on its surface**.
 - HPF is currently surveying the nearest low-mass stars, also called **M-dwarfs**, which are the most common stars in the galaxy - with the goal of discovering exoplanets in our neighborhood.

Doppler Effect

- An increase (or decrease) in the frequency of sound, light, or other waves as the source and observer move towards (or away from) each other.
- The effect causes the sudden change in pitch noticeable in a passing siren, as well as the red shift seen by astronomers.

Exoplanet

- An exoplanet or extrasolar planet is a planet outside the Solar System. The first confirmation of detection of exoplanet occurred in 1992.
- Exoplanets are very hard to see directly with telescopes. They are hidden by the bright glare of the stars they orbit.
- So, astronomers use other ways to detect and study exoplanets such as looking at the effects these planets have on the stars they orbit.

M-dwarfs

- M dwarf or M-type star, also called Red Dwarf Star are the most numerous type of star in the universe and the smallest type of hydrogen-burning star.
- These have masses from about 0.08 to 0.6 times that of the Sun.
- In the Milky Way Galaxy, about **70% of the stars are red dwarfs**.

Source:IE