



## New Super-Earth Discovered

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A newly published research paper has reported the **discovery of a planet through radial velocity method** in orbit around one of the closest stars to the Sun, **Barnard's star**.

The potentially **rocky planet** is known as **Barnard's star b**.

### Barnard's star

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- At nearly 6 light years away, Barnard's star is the **next closest star to the Sun** after the **Alpha Centauri triple system** (Alpha Centauri A, Alpha Centauri B, Alpha Centauri C or Proxima Centauri).
- It is a type of faint, low-mass star called a red dwarf. Red dwarfs are considered to be the best places to look for exoplanets (planets outside our Solar System).

### Barnard's star b

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- Barnard's star b is a '**Super-Earth**' with a mass of at least 3.2 times that of the Earth, and it orbits around Barnard's star once every 233 days.
- Super Earth is just a planet with more mass than Earth, but less than a larger planet like Uranus or Neptune.
- Barnard's star b is the **second-closest known exoplanet to the Sun after Proxima b** (discovered in 2016) orbiting around the red dwarf star Proxima Centauri.

### Significance

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- The planet lies at a distance from the star in a region that is known as the '**snow line**'.
- Snow line is beyond the habitable zone in which liquid water, and possibly life, could exist.
- The planet's surface temperature is estimated to be around  $-170^{\circ}\text{C}$ , meaning it is likely to be a frozen world. Such conditions would make it uninviting to Earth-like life.

- However, if the planet has a substantial atmosphere, the temperature could be higher and thus conditions could be potentially more hospitable.

### **Radial Velocity Method**

- The researchers used the radial velocity method also known as Doppler spectroscopy during observations that led to the discovery of Barnard's star b.
- This technique detects wobbles (fluctuations) in a star which are likely to be caused by the gravitational pull of an orbiting planet.
- These wobbles affect the light coming from the star. As the star moves towards the Earth its spectrum appears slightly shifted towards the blue and, as it moves away, it is shifted towards the red.
- This is the first time that this technique has been used to detect a planet this small so far away from its host star.