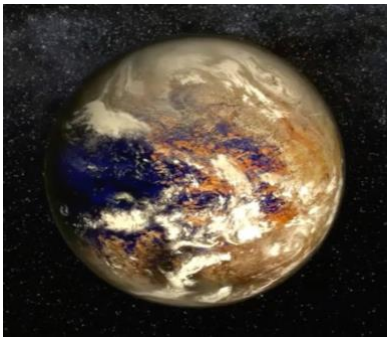
PROXIMA CENTAURI B



Mikko Tuimi was the first person to find indications of the existence of Proxima Centauri b in archival observation data in 2016. Proxima Centauri b is classified as a super Earth exoplanet by NASA (because it is a planet unlike any in our solar system.) that is similar in size to Earth and located in the Alpha Centauri solar system in our Milky Way galaxy.

Proxima Centauri b is located within the classical habitable zone and is the closest exoplanet to Earth. It is tidally locked to its star just like the Moon is to Earth. This means one side is always in complete darkness. The bright side has very high temperatures making it too hot to sustain life however NASA's newer model work suggests that the wind could possibly distribute the heat evenly potentially making the dark side habitable.

That is one of the big questions: Is Proxima Centauri b habitable?
A planet that can sustain life for a significant period of time is considered habitable. For a planet to be habitable it needs to have liquid water (the only way to detect this from space is that the planet must have water on its surface) At this time we do not know if the exoplanet has water. Another factor is the stability of the atmosphere. The strong irradiation by UV radiation and X-rays creates a challenge to the habitability of the exoplanet. There are also the stellar winds and coronal mass ejections are an even bigger risk to an atmosphere.

There are a lot of considerations for the habitability of red dwarfs. Here are a few: The UV radiation is redder (colder) therefore may interact less with organic components and may produce less ozone. Oxygen and/or carbon dioxide may build up in the atmosphere and become toxic. If the exoplanet has oceans, the tides could lead to flooding and drying of coastal landscapes.

The Studies (which have been submitted for publication to the Astronomy & Astrophysics journal) used the latest advanced technology, tools, and observations available to investigate the history of Proxima b and the number and

amount of gases and liquids that could still be present on its surface. Researchers found that Proxima b gets 60 times more high-energy radiation than Earth. The amount of water on the exoplanet is unknown but calculations reveal that Proxima b could have lost about 1 ocean's worth of water due to the early irradiation in the first 100 – 200 million years after formation. After that time, it is unknown and uncertain what happened. It could continue to lose water and end up dry and the atmosphere less, or it could have preserved its liquid water and kept most of its atmosphere. Both possibilities are still possible!

Today we have advanced technology, enabling us to discover so much more! The James Webb Telescope can be used to look at Proxima b and see if it is habitable. Webb has the near-infrared instrument, and this can be used to look for the telltale signs of LED light waves in the light from the exoplanet and its host star to detect if this artificial light exists. In 2019 Radio waves were detected coming from the direction of Proxima b, for 5 minutes. It was never seen again. This was considered a human anomaly; astronomers believe this was likely just interference from natural sources. However, we cannot rule out alien life because the anomaly was never discovered. There is so much that is still unknown about Proxima but that just means there is still so much more to be discovered and learned!

Works Cited

Exoplanet Exploration: Planets Beyond our Solar System. 2022. *Exoplanet-catalog – Exoplanet Exploration: Planets Beyond our Solar System*. [online] Available at: <https://exoplanets.nasa.gov/exoplanet-catalog/7167/proxima-centauri-b/> [Accessed 17 August 2022].

Space.com. 2022. *Found! Potentially Earth-Like Planet at Proxima Centauri Is Closest Ever*. [online] Available at: <https://www.space.com/33834-discovery-of-planet-proxima-b.html> [Accessed 17 August 2022].

Youtube.com. 2022. *James Webb Telescope's Terrifying Discovery on Proxima B will Change Everything*. [online] Available at: <https://www.youtube.com/watch?v=SOk0zUZiDjo> [Accessed 17 August 2022].

Webb.nasa.gov. 2022. *Key Facts - Webb/NASA*. [online] Available at: <https://webb.nasa.gov/content/about/faqs/facts.html> [Accessed 17 August 2022].

En.wikipedia.org. 2022. *Mikko Tuomi - Wikipedia*. [online] Available at: <https://en.wikipedia.org/wiki/Mikko_Tuomi#Discoveries> [Accessed 17 August 2022].

Miller, J., 2022. *Astronomers Confirm Proxima Centauri Hosts Earth-Sized Planet*. [online] Astronomytrek.com. Available at: <https://www.astronomytrek.com/proxima-centauri-exoplanet/> [Accessed 17 August 2022].

En.wikipedia.org. 2022. *Proxima Centauri b - Wikipedia*. [online] Available at: <https://en.wikipedia.org/wiki/Proxima_Centauri_b> [Accessed 17 August 2022].

Morrison, R., 2022. *NASA's James Webb telescope may spot artificial lights on Proxima b*. [online] Mail Online. Available at: <https://www.dailymail.co.uk/sciencetech/article-9601699/NASAs-James-Webb-Space-Telescope-able-detect-artificial-lights-Proxima-b.html> [Accessed 17 August 2022].

Exoplanet Exploration: Planets Beyond our Solar System. 2022. *Super-Earth | Planet Types – Exoplanet Exploration: Planets Beyond our Solar System*. [online] Available at: <https://exoplanets.nasa.gov/what-is-an-exoplanet/planet-types/super-earth/#:~:text=The%20basics-,What%20is%20a%20super%2DEarth%3F,to%2010%20times%20its%20mass.> [Accessed 17 August 2022].

Ice.csic.es. 2022. *The habitability of Proxima Centauri b*. [online] Available at: <https://www.ice.csic.es/personal/iribas/Proxima_b/index.html> [Accessed 17 August 2022].