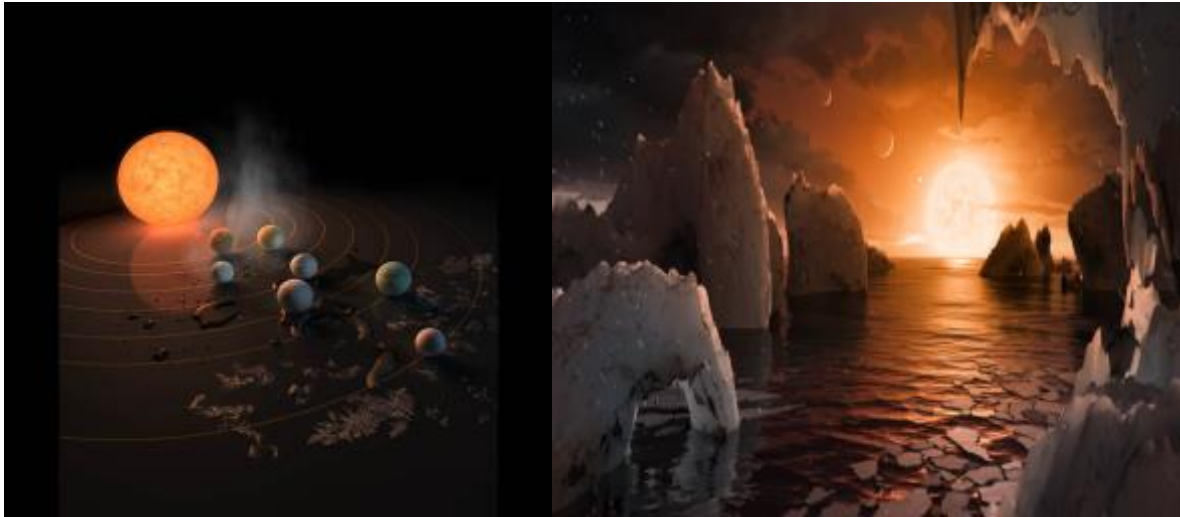

TRAPPIST-1'S SEVEN EARTH-LIKE PLANETS

By Vashaanth Gowri-Kriszyk



In February 2017, the possibility that there are intelligent life forms out in space has increased because of the discovery of a star system called Trappist-1. Trappist-1 is a record-breaking star system because it has seven Earth-like planets, six that could have life and three in the Goldilocks Zone. However, what is the Goldilocks Zone? What is special about Trappist-1? Read on to find out more.

What is the Goldilocks Zone?

Before reading this section, I advise you to read the fairy tale called Goldilocks and the Three Bears. If you have read the book, then reading the book again is not needed. The important part of the story for this particular article is that there is a girl who has three bowls of porridge in front of her. One bowl is too hot, another is too cold and the one was just right. She tastes the porridge and after finding the too hot and too cold porridge she finds the perfect choice.

In the following section, to make it easier to understand, I am using Earth as an example. The Goldilocks Zone is a zone around any star where a planet would have Earth-like qualities. This means if Earth was too close to the sun, it will be in the Venus Zone, meaning that Earth will be too hot and if the Earth was too far from the sun, then it will be too cold. In the above two examples, these are inhabitable zones which means that no life can exist. However, there is another zone called the Goldilocks Zone and in this zone, it is not too cold or too hot.

How far away is Trappist-1?

To see how far away Trappist-1 is from Earth, see figure 1. For information about the units in astronomy see information below Figure 1.

<u>Unit used in astronomy.</u>	<u>How far from Trappist-1 is in the unit used in astronomy.</u>
Light Years	39
Astronomical Units (AU)	2466402.0064346
Parsecs (PC)	11.957454358
Kilo-parsecs(KPC)	0.011957454
Mega-parsecs (MPC)	0.000011957
Giga-parsecs(GPC)	0.000000011

Figure 1

One Light Year is the distance light travels in one year and it travels about 6 trillion miles or 9,656,064,000,000 (nine trillion, six hundred and fifty-six billion, sixty-four million kilometres.) km in this time.

One AU is the distance from the sun to the Earth.

One Parsec is "A star with a parallax of 1 arcsecond has a distance of 1 Parsec."

1 parsec (pc) is equivalent to:

206,265 AU which means 3.26 Light Years. In other words, this is 3126.118 km.

The parsec is a unit of length used in astronomy, equal to about 3.26 light years, or about 30.9 trillion kilometres (19.2 miles).

The name parsec is “an abbreviation of ‘a distance corresponding to a parallax of one arcsecond’.” It was coined in 1913 at the suggestion of British astronomer Herbert Hall Turner. A parsec is the distance from the sun to an astronomical object which has a parallax angle of one arcsecond (1/3,600 of a degree).

1000 parsecs equals 1 kilo-parsec and 1000000 parsecs equals 1 mega-parsec. 1000000129.63 parsecs equals 1 giga-parsec.

What is so special about Trappist-1?

Trappist A is the Trappist-1's star's name but the planets are letters b, c, d, e, f, g and h.

The six inner planets, Trappist b, c, d, e, f and g, could have life but three are in the habitable zone. However, there are seven planets. The scientists predict that planet number seven or Trappist h is a frozen world, very much like Jupiter's moon, Europa.

Trappist A is a very cold red dwarf star.

Trappist-1 is named after the telescope called TRAPPIST, short for the Transiting Planets and



Planetesimals Small Telescope (Also called TRAnsiting Planets and Planetismals Small Telescope).

The planets' densities hint that they are rocky like Earth.

"The seven wonders of TRAPPIST-1 are the first Earth-size planets that have been found orbiting this kind of star," said Michael Gillon, author and leader of the paper and is also the leader of the TRAPPIST exoplanet survey at the University of Liege, Belgium. Furthermore, according to him, it is also the best target yet for studying the atmospheres of potentially, Earth-size worlds.

In Trappist-1 the planets might be what scientists call tidally locked, meaning that one side of all the planets are night and the other side is day forever. This does not change, consequently if there is any life in Trappist-1 it would struggle to plant their equivalent of fruits and vegetables in either freezing or burning temperatures. This would mean that the animals and humanoids on the planets will either melt away or freeze.

"The TRAPPIST-1 system provides one of the best opportunities in the next decade to study the atmospheres around Earth-size planets" , said Nikole Lewis, a co-leader of the Hubble study and astronomer who works at the Space Telescope Science Institute in Baltimore, Maryland.

NASA's Kepler space telescope that hunts for planets is studying the TRAPPIST-1 system, making

measurements of the star's small changes in brightness because of transiting planets.

James Webb is a telescope that can search for elements that are produced by life. The telescope can also measure the temperatures and pressure on the surface of planets.

This means Hubble, Kepler and James Webb, which will launch next year, are all discovering more and more about Trappist-1.

How has this affected the world?

This mean that more people might start to believe that extra-terrestrial do exist. There would be more interest in research about exoplanets. Consequently, more telescopes will be needed than ever before. On the other hand, this could also mean that there will be less discoveries in other parts of astronomy as less people might be interested in researching these areas.

To conclude, these new discoveries can probably affect the world both positively and negatively. An important message these findings show us is that our universe is huge and that it is very unlikely that we are alone in the universe.

For more information, see below.

Videos

A little video about the scale of the universe.

https://www.youtube.com/watch?v=sh_t645ntOs

The doodle by Google celebrating the discovery of Trappist-1's seven Earth-like planets.

<https://www.google.com/doodles/seven-earth-size-exoplanets-discovered>

A video of how it might be to land on Europa and how Europa is and Trappist-1 might be.

<https://www.youtube.com/watch?v=DqPa1iEfgsU>

A weather balloon flying to the sky.

<https://www.youtube.com/watch?v=K5QDOrdA-Uk>

Books

Stars and Galaxies by Michael A. Seeds.

Astronomy: The Ultimate Beginners Guide to Discover Stars, Galaxies, Wormholes, Black Holes and Astronomy Gadgets by Joseph Halley.

Websites

<http://www.kidsastronomy.com/>

NASA's Kids Club:

<https://www.nasa.gov/kidsclub/index.html>

NASA's Starchild:

<https://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>

NASA's Imagine the Universe:

<https://imagine.gsfc.nasa.gov/>

Science for Kids' space section:

<http://www.sciencekids.co.nz/space.html>

Science for Kids' Topics:

<http://www.sciencekids.co.nz/topics.html>

Places to visit.

The National Space Centre:

<http://spacecentre.co.uk/>

<http://spacecentre.co.uk/whats-here/>

The Science Museum:

http://www.sciencemuseum.org.uk/visitmuseum/plan_your_visit/exhibitions/exploring_space

Spaceport:

<http://www.spaceport.org.uk/Pages/default.aspx>