TOI-560c
Journal & Analysis

Ioana Sergiu Lucian
Ance Yasmine Isabela

Project Description

Our goal

Our goal was to further analyse the planet TOI-560c, discover its orbital period, the distance between it and its host star, its density and composition, and probably the most important factor when discovering any new planet; its habitability, or its ability to sustain living organisms.
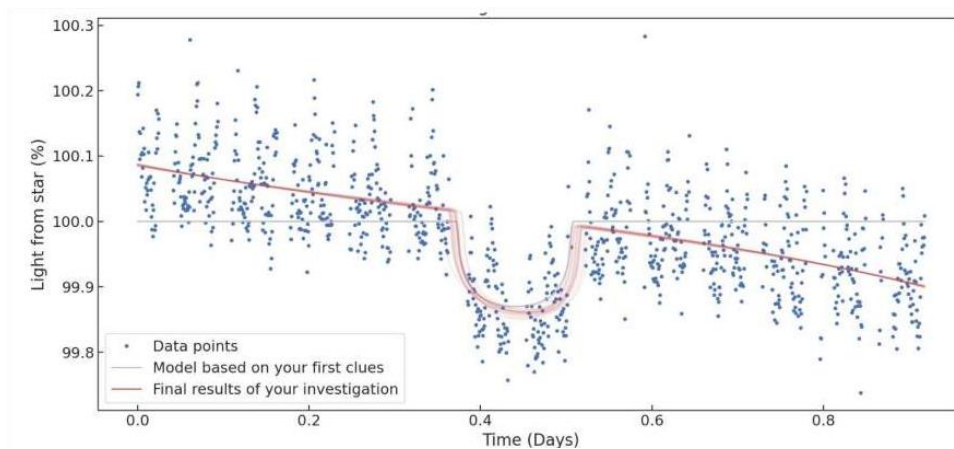
Analysis

After following the steps that were taken during the exploration of KELT-3B, we have our results.

Step 1

The first step was to access its data, which we did using allesfitter.

Step 2

The second step was to find its transit depth, and its size.

The transit depth can be directly measured on the graph above. It is somewhere around **0.1%**.

Its size was determined using the following formula:

$$Rp = \sqrt{Rs^2 x \frac{transit\,depth}{100}}$$

Where Rp is the radius of the planet;

Rs is the radius of the host star;

In our case, the radius of the star is known and provided in the case file:

Rs=0.65 RSun

$$Rp = \sqrt{0.65x\frac{0.1}{100}} = 0,022$$

We then converted the result to earth radii units by multiplying the result with 109 (this is because the radius

of the sun is 109 bigger than the radius of the earth)
Rp=0,022 x 109 = **2,398**

Step 3

On the third step, we had to find the orbital period and the distance between the planet and its host star

The orbital period was known and again provided in the case file.

T=18.8797 days, converted in seconds, it's about 1631206.08 seconds

The distance was calculated using the following formula: $d = \sqrt[3]{\frac{GMs}{4\pi^2}} \times T^2$

G- gravitational constant

Ms- mass of the star

T= orbital period

We complete the equation with what we already know, giving us the following :

$$d = \sqrt[3]{\frac{6.67430x10^{-11}m^3kg^{-1}s^{-1} \times 1,45 \times 10^{30}}{4\pi^2}} \times 1631206^2$$

After converting into A.U (astronomical units) the result should be around **0.12** A.U

This number is comparable to mercury, which orbits 0.4 A.U from the sun

Step 4

On step 4 we had to determine the temperature and habitability of the planet TOI-560c. Of course, this planets temperature is way too high to sustain life (or at least life as we know it)

TOI-560c has a temperature of 225 celsius

Step 5

The last step was to find out its composition and volume

$$q = \frac{M}{V}$$

Volume can be calculated, assuming that it is a perfect sphere

$$V = \frac{4}{3} \times \pi \times R^3$$

$$V = 61867 \ km^3$$

Lastly, the density which is $q = \frac{58 \times 10^{27} Kg}{61867 \ Km^3}$

Conclusion:

TOI-560c is a neptune-sized planet that orbits very close to its host star. Its composition is mostly made up of Helium and Hydrogen, it is

a gaseous planet **OR** if it is as similar to Neptune as we think it is, its composition could consist of water, ammonia and methane. This planet is not habitable, as it is far too hot for it to sustain life.