TOI-560

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with respect TOI-560 we get te following data:

Name	Median value	Lower error	Upper error	Case note	Target
Radius of the planet (in units of Earth radii)	2.384	0.071	0.078	Cheops observations	TOI-560c
Radius of the star (in units of Solar radii)	0.653	0.017	0.015	Cheops observations	TOI-560c
Mid-transit time (in units of days)	0.4413	0.0052	0.0055	Cheops observations	TOI-560c
Orbital period (in units of days)	18.8797			Other observations from the archive	TOI-560c
Orbital semi-major axis (in units of AU)	0.1242			Other observations from the archive	TOI-560c

Figure 1: principal data

1 Determination of the radius of the planet

We will use the following formula:

$$D\% = \frac{\pi R_p^2}{\pi R_s^2} * 100 \tag{1}$$

We need to find R_p^2, from the graphics we will obtain the deep of the transit:

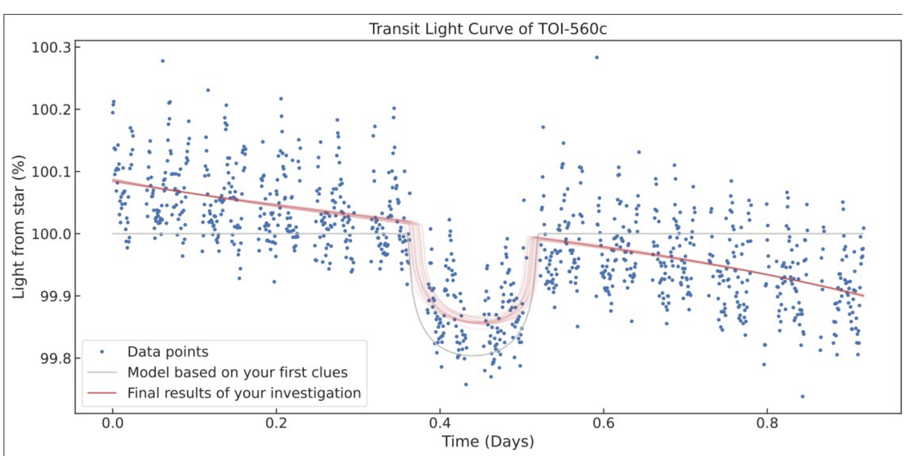

Figure 2: Curve obtained

we observe that the deep of the transit is $D\% = 100\% - 99.8\% = 0.2\%$ so the expretion for R_p is $R_p = \sqrt{\frac{0.2}{100} R_s^2}$, in the figure 1 we observe $R_s = 0.653 R_{\odot}$,($R_{\odot}$ is the radius of the sun) so the radius of the planet is:

$R_p = \sqrt{\frac{0.2}{100}(0.653 R_{\odot})^2} = 0.0292 R_{\odot}$

2 Determination of the distance of the Planet to the Star

In this step we will use the third law of Kepler, that says :

$$T^2 = \frac{4\pi^2}{GM} d^3 \tag{2}$$

We know the period from the figure 1 ($T = 18.8797$ dias) and also we know the mass of the star ($M = 0.73 M_{\odot}$)

So we get the equation to the distance to the star:

$d = \sqrt[3]{\frac{GMT^2}{4\pi^2}}$ we calculate, considering $M_{\odot} = 1.99 \times 10^{30}$kg., 1 $day = 24[h] * 3600[s]$, $d = \sqrt[3]{\frac{(6.673\times10^{-11})(0.73 M_{\odot})(18.8797d)^2}{4\pi^2}} = 1.869 \times 10^{10}[m] = 0.125[ua]$

where we consider $1[ua] = 1.496 \times 10^{11}[m]$

3 Temperature

from the distace obtained, we can see that the planet are much close to his star, so the temperature in the planet must be really high, so the posibility of life can be discarted.

4 Density and Composition

In this step we will use two equations:

$$\rho = \frac{M_p}{V} \tag{3}$$

And

$$V = \frac{4}{3}\pi R_p^3 \tag{4}$$

combined this two equations we get:

$\rho = \frac{3M_p}{4\pi R_p^3}$

We know that the mass of the planet is:$M_p = 9.7 M_T$ where $M_T = 5.98 \times 10^{27}[g]$ is the mass of the Earth, and also know the radius of the planet $R_p = 2.384 R_T$ where $R_T = 6370 \times 10^5 [cm]$.making the calculations:

$\rho = \frac{3(9.7(5.98 \times 10^{27}[g]))}{4\pi(2.384(6370 \times 10^{5}[cm]))^{3}} = 3.954 \frac{g}{cm^{3}}$
we can use the following table to know about the composition:

Planeta	densidade média
Mercúrio	5,44
Vênus	5,25
Terra	5,52
Marte	3,94
Júpiter	1,24
Saturno	0,63
Urano	1,21
Netuno	1,67
Plutão	1 (??)

Figure 3: mean densitys of the planet of the solar system

so we observe that the density is approximately Mars density, so is a Earthlike planet, probably composed of SILICE, IRON and BASALT.