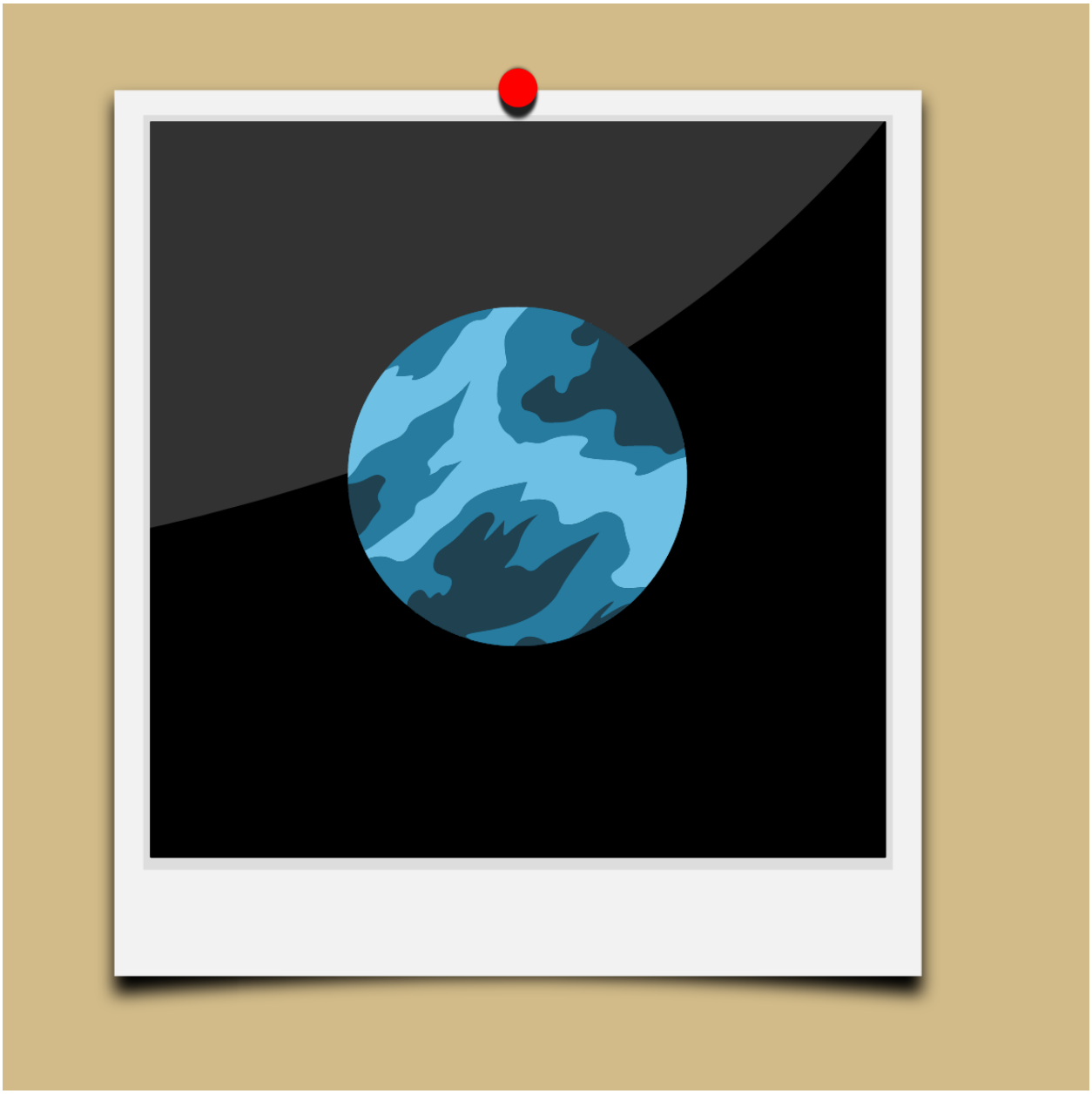
IES FERNANDO III

TOI 560-C analysis



Summary

This work has sought to know in depth the most characteristic properties of this exoplanet, of course with the invaluable help of the Cheops satellite and the software used to know the data, "Allifists". In addition, we have also used the Kepler and Newton equations along with the video tutorials provided by ESA. From its own radius, which is 2.6977 R_T, up to the distance from himself to his star, this being 0.1244 AU. Also applying logic from the data given by the organization we were able to assume that life on this planet was impossible due to its high temperatures reaching up to 225º C. TOI 560-C has a density of 2.72 kg/m^3, which makes it have a lower density than Earth.

Analysis of the obtained results

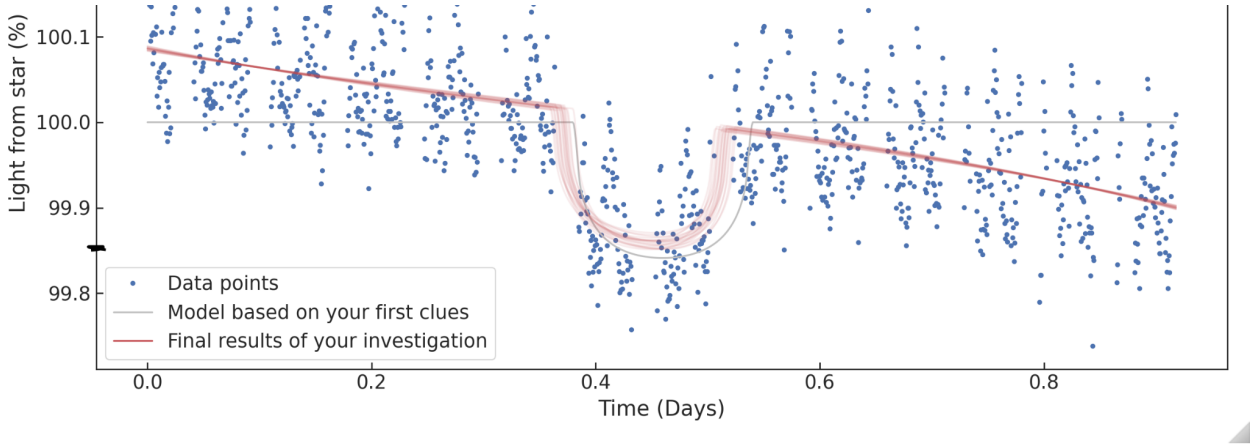
The first of the calculations led us to know the radius of our planet, thanks to the transit depth equation.

$$Profundidad\ de\ tránsito\ (\%) = \frac{\pi \cdot Rp^2}{\pi \cdot Rs^2} \cdot 100$$

Which was essential to obtain data that would be substituted in the following equation:

$$Rp = \sqrt{\frac{Depth\ transit \cdot 0{,}65^2 \cdot Rs}{100}}$$

And thus know the radius of our exoplanet.It gave us a value of 2.6977 R_T , that is, the radius of the exoplanet is 2.7 times the terrestrial radius. For this we had to rely on this graph:



In our second objective we had to calculate the distance at which this planet is from its reference star. We realized that it was much closer than our planet to the sun, exactly at0.1244 AU, that is, it is ten times closer to its star than Earth is to the Sun. Then, we could understand that it is at a higher temperature than Earth.All this thanks to Kepler's formula that, once we clear the distance, says the following:

$$d = \sqrt[3]{\frac{T^2 \cdot G \cdot Ms}{4\pi^2}}$$

Which brings us to our third objective, in which, by relating the temperature of the exoplanet, which is 225ºCwith the possibility of lifeTaking into account that at these temperatures the presence of water in a liquid state is null, then life for living beings with a complex molecular structure is impossible. However, some bacteria could live in such conditions, but they would have to be studied in more detail.

In our last calculation we have managed to know the density of TOI 560-CFor this we had to, first find the volume that this planet occupies by means of the following equation:

$$v = \frac{4}{3}\pi\, r^3$$

And later we have substituted it in this equation:

$$d = \frac{m}{v}$$

It gives us a result of about 2.72 kg/m^3. After analyzing the table of the densities of the other planets in the solar system, we can come to the conclusion that this planet is gaseous, just like Neptune for example.

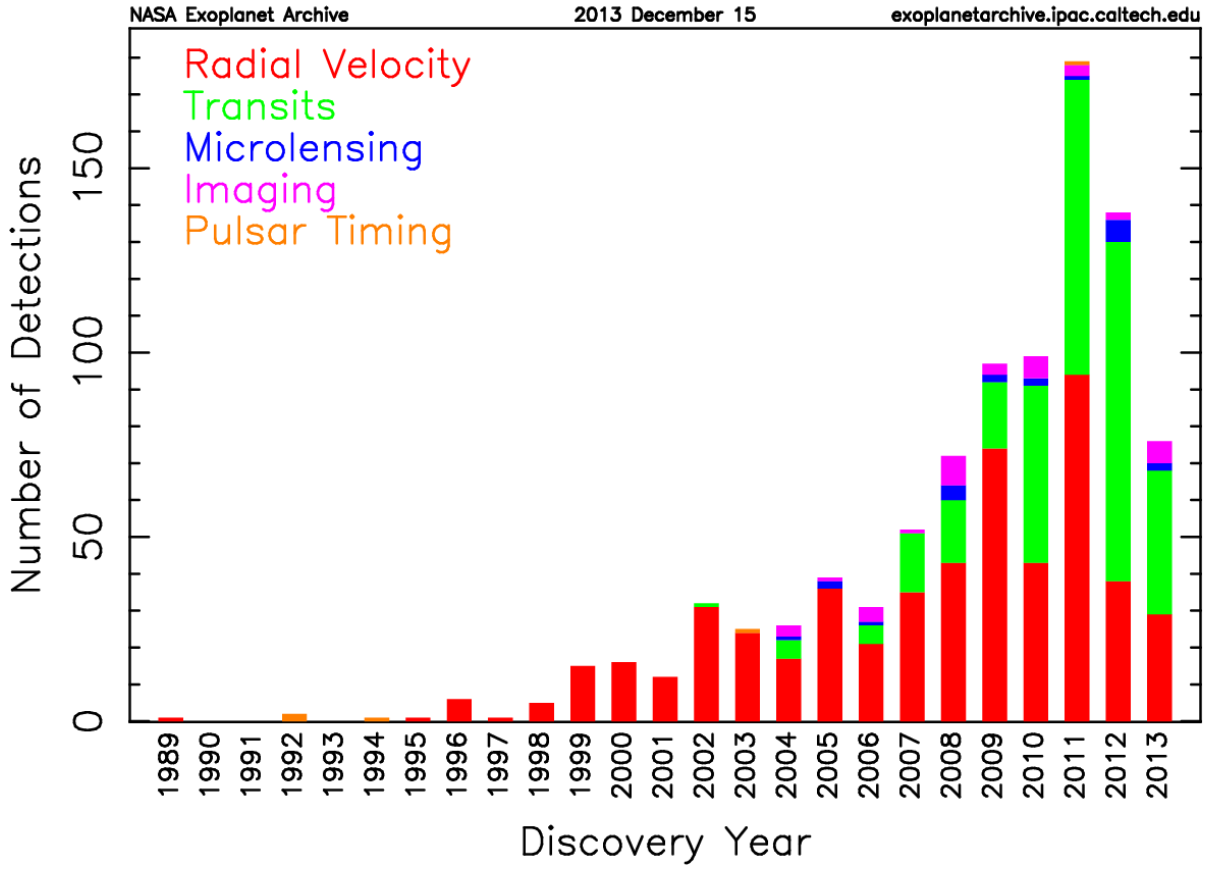
Also thanks to the table given by the program we have been able to obtain a lot of data such as:

- The orbital period of the planet: being 18.87 days to go around its star. This very short orbital period is due to the closeness between the star and the planet.

Name	Median value	Lower error	Upper error	Case note	Target
Radius of the planet (in units of Earth radii)	2.379	0.067	0.071	Cheops observations	TOI-560c
Radius of the star (in units of Solar radii)	0.651	0.017	0.018	Cheops observations	TOI-560c
Mid-transit time (in units of days)	0.442	0.0056	0.0051	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

Conclusions

TOI 560-C is a planet closer to its star than Earth is to the sun, being in turn larger than Earth, at a higher temperature than Earth and less dense than it. But not everything is about these data, it is impressive how simply by measuring the amount of light received it is possible to know of the existence of a planet that we do not even see or imagine. This also makes us see the essence of the human being always thirsty for curiosity, looking for new places and who knows if in which to live one day.



This graph given by NASA represents the number of exoplanets discovered per year, although it is not an updated graph, we can see that the trend is clearly upward, with further of 150 new exoplanets. This gives us an idea of the constant advances that this branch of astronomy is undergoing,equal It is the advancement of technology that makes these discoveries possible.