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TP
Using the exoplanetary database to visualise and analyse the properties of exoplanets

(approximate duration 1h30)

Explore the exoplanet.eu website:

1. Go to the "plots" tab on the exoplanet.eu site and use the appropriate tool to produce a histogram of the number of exoplanet discoveries over time.

2. Explain the variations observed. If necessary, you can use the Internet to find the dates of certain missions or instruments.

3. Use the histogram tool to analyse the spatial distribution of stars hosting exoplanets. What do you conclude from this?

4. Explore the mass histogram. Comment on the minimum and maximum bounds. The mass distribution shows an increasing number of planets as the mass decreases. Is this true? Activate the log scale to "zoom in on small values", and change the mass unit to Earth masses. Comment on what happens around 30 Earth masses?

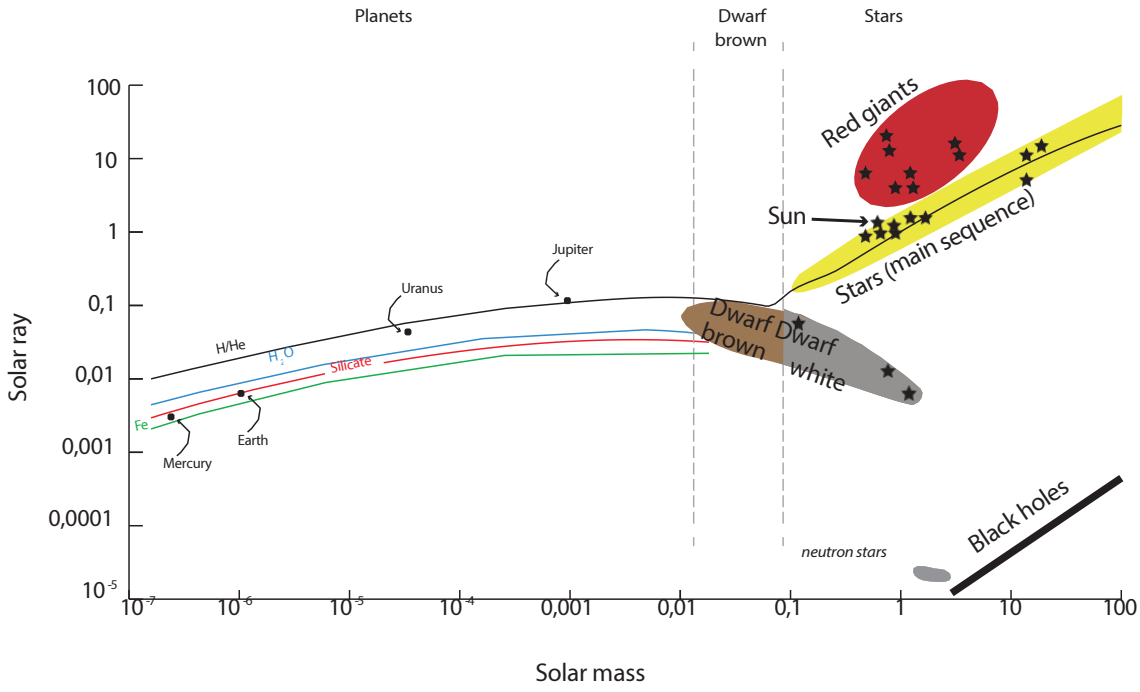
5. Explore the histogram of the semi-major axes. Where are the most distant exoplanets detected? Put it into perspective in relation to the distances in the Solar System. Where are most of the planets discovered? Justify this value with a quick calculation.

6. Explore the histogram of eccentricities. Any comments?

7. Use another tool on the exoplanet.eu website to produce a figure showing all the exoplanets known to date, classified by semi-major axis (x), mass (y) and eccentricity (variable size).

- Locate the Solar System planets on this figure, as well as 51 Peg b (a=0.05UA; m=0.47 $_{MJ}$) and Kepler 10 b (a=0.017UA; m=3.24 $_{MT}$).
- Find out more about the different families of exoplanets presented in the course.

8. Explore the Mass - Radius diagram, in log-log coordinates and in Earth units. How are planets of Earth radius dispersed? The following diagram shows all the celestial objects and compares them with material densities. We can see that the Earth and Mercury are compatible with rocky objects. Any comments?



9. Display the diagram Periods - Half-major axes, in log-log coordinates. What does it show? Explain the dispersion of the points

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