

# Homework 5

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Objectives : Use exoplanet database and interpret some recent discoveries.

## 1 Planet Mass vs Effective Temperature of the Host star

1) Connect to the American exoplanet database [exoplanets.org](http://exoplanets.org), click on "Plots" and produce the graphic « **Planet Mass [Earth Mass] vs Effective Temperature of the Host star [K]** ». Put the ordinates axis in logarithm scale. Use the filters to differentiate the planets discovered by the transit method (red), the radial velocities (blue), the gravitational lens (green) and by direct imaging (yellow). Add a "Marker Scale" to illustrate the eccentricity of the planets.

2) Interpretation:

1. Define the effective temperature of a star. From which observables do we determinate it ?
2. For each detection methods, around which kind of stars do we detect the majority of planets ? Why ?
3. What are the main problem and advantage of the gravitational lens method (*hint : see the next figure*)?
4. Which kind of planet populations (in terms of mass and eccentricity) are preferentially detected by each method ? Why ?
5. Compare with our Solar System.

## 2 Detected planets vs Distance to the star

1) Plot the histogram of the «**Detected planets in function to the Distance to the star [pc]**» for each detection methods (keep the same color code as previously). Put the abscissa axis in logarithm scale.

2) Interpretation:

1. For each detection method, explain intuitively the influence of the star distance.

2. Deduce the typical distances accessible with these different methods.
3. Which analysis do you make in terms of reachable distances and possible confirmation of these discoveries ?