

## Discovering Alien Worlds The Discovery of an Exoplanet

### Overview

This demonstrator introduces the concept of an exoplanet and how they have been discovered in our universe. Students are introduced to the transit method of exoplanet detection. Real images will be used to look for changes in the starlight that might result due to the motion of an orbiting exoplanet. Students will learn how to use a specific image software to perform photometry on the images and will create light curves. The analysis of the light curve will allow students to estimate the rotational period of the exoplanet and its diameter. Students can present their work to the class and discuss how they compare with the most accurate results that astronomers have.

### Learning outcomes:

1. Teach students about the discovery of exoplanets.
2. Allow students to understand the science and methodology behind the discovery of alien worlds.
3. Introduce basic concepts of Astronomy and Image Processing.

- Basic Astronomy knowledge of a star and planet system
- Excel (charts)

### Concepts introduced:

- Exoplanets
- Luminosity
- Photometry
- Graph analysis

### Prior knowledge:

### Learning intentions:

By the end of this descriptor, students should be able to:

- Define an exoplanet
- Explain the transit method
- Describe a method to collect luminosity data
- Examine images using the salsa J software
- Form conclusions about a planet from a light graph

### Key activities:

1. Videos to engage
2. Explaining the light curve – hands-on activity
3. Salsa J – examination (photometry) of 3 stars
4. Analysis and explanation
5. Final report and discussion

### Questions:

By the end of this descriptor, students should be able to answer the following:

1. Write a couple of sentences describing what you learned about exoplanets (what they are, why do we want to find them, etc.).
2. It is difficult to observe exoplanets. Why? Can you describe how to detect an exoplanet using the light curve of a star?
3. Which parameters can we get from the analyses of the light curve?
4. How do we know it is a transiting planet?