CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
34489

Project Title
Alien Atmospheres: Searching for Exoplanet Bow Shocks

Abstract

Objectives/Goals
The goal purpose of this project is to detect the predicted bow shock of extrasolar planet Hat-P-20b by looking at the way its magnetic field reacts with different wavelengths of light.

Methods/Materials
By measuring the light intensity of the transit of this planet in front of its host star with two different light filters and plotting the data, the resulting light curves can be compared to find signs of a bow shock. A planetary bow shock would interact with light in the near ultraviolet wavelengths, and cause either an early ingress or late egress in that wavelength compared to the near infrared wavelengths.

Results
Performing this process on Hat-P-20b produces two light curves that show signs of a bow shock and a substantially late egress.

Conclusions/Discussion
A review of these light curves show that abnormalities in the data make it difficult to conclude that there is a detected bow shock around HAT-P-20b. More measurements are needed to confirm this detection.

Summary Statement
The goal purpose of this project is to detect the predicted bow shock of extrasolar planet Hat-P-20b by looking at the way its magnetic field reacts with different wavelengths of light.

Help Received
Used data from Faulkes Telescope North under supervision of Dr. James Armstrong.