



The Search For Extra-Solar Planets

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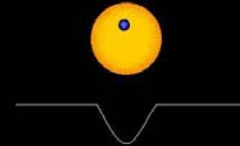


Background

Since as early as 1969, astronomers have observed stars to determine the possibility of something such as a planet orbiting them. Using Doppler (red and blue shift) and radial velocity techniques, astronomers could analyze the motion of the star to predict the characteristics of the planet such as orbital period, velocity, and mass.

However, a new technique has developed in the last few years which examines the flux in magnitude of star light to determine the presence of an orbiting planet. The Transit Technique is useful, accurate, and easily accomplished by ground telescopes.

Light Curves and Transits

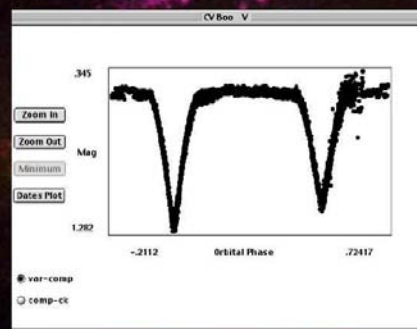


When a planet "transits" (passes in front of the star), the light becomes dim by as little as 1% of the original star magnitude.

Objectives

- Analyzing light curves of variable stars
- Detecting known extra-solar planets with the University of Arkansas telescope and equipment
- Finding a planet ourselves at the University

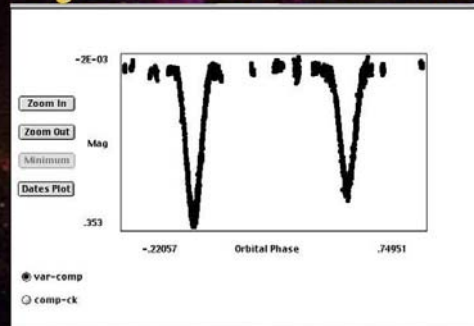
Light Curve of CV Boo, variable star



Methodology

- Light curves are produced from digital photographs of stars taken during the night. Each group of photos from a single star is analyzed for a change in magnitude as determined from constant check and comparison stars nearby. A properly phased light curve shows a noticeable dip in magnitude.
- By scheduling observations around the time of transit of a known extra-solar planet, we can analyze the light curve to see if we can accurately detect the transit with our equipment.
- With future improvements and refinements, searches of mass numbers of stars could produce one with a planet we are capable of detecting at the university.

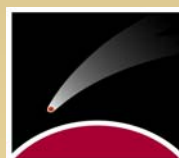
Light curve of V482 Per



These light curves were generated using programs Designed and Written by Dr. Lacy and Photographs Taken by the Telescope at the University of Arkansas.

Results and Future Research Plans

- The university has analyzed the light curves of over 35 stars with its telescope since November of 2001.
- Observations of HD209458, a star with a known orbiting planet, are planned for the future to be analyzed with our equipment and computer programs.
- Actually discovering a planet will take more refinement of instruments and finding just the right star to observe.



Arkansas - Oklahoma Center for Space & Planetary Sciences



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