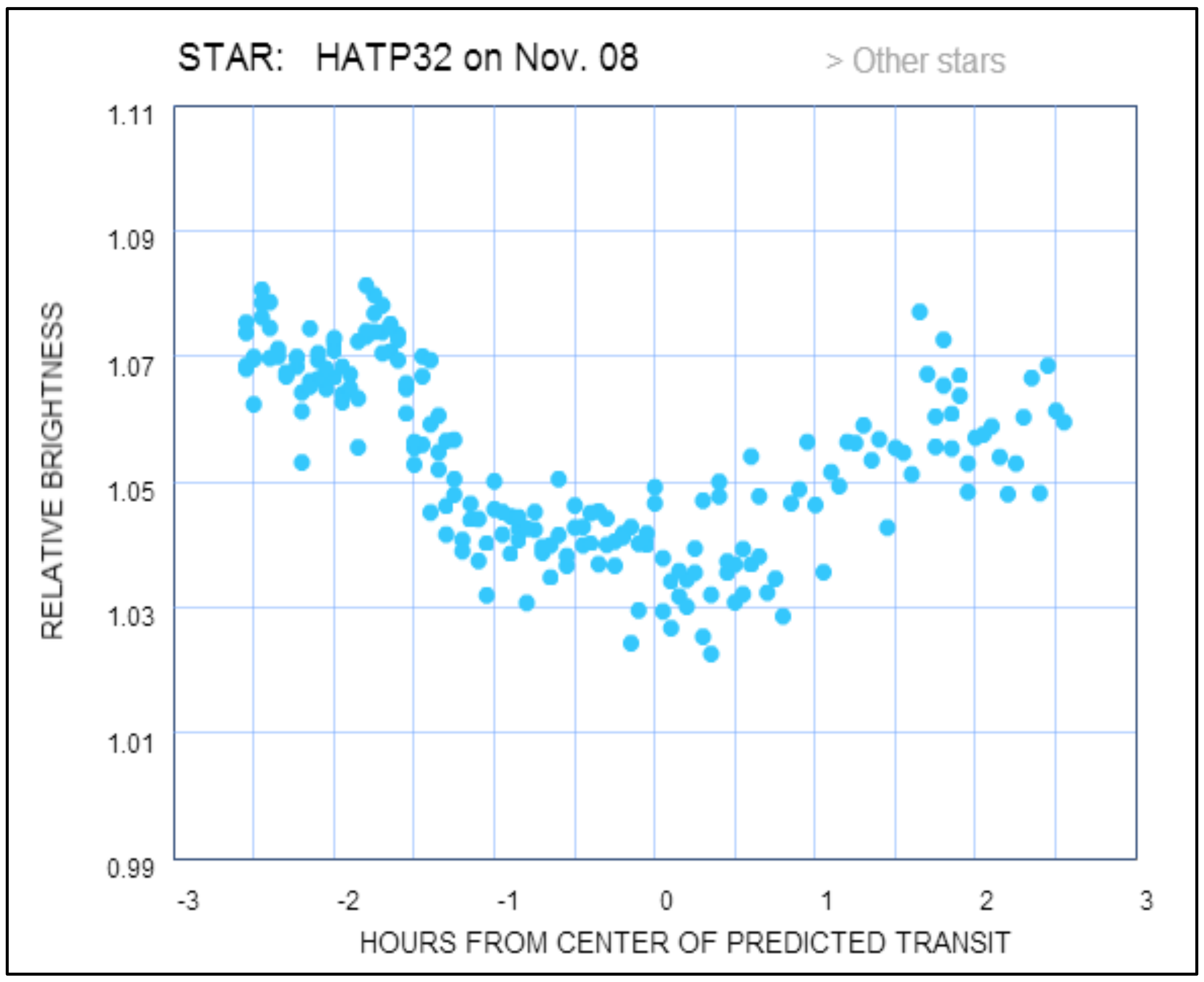
The Journey to HAT-P-32

Introduction

This is a research project on the star HAT-P-32. We wanted to see if the star had an exoplanet orbiting it and if so, how much information we could find about the said exoplanet.

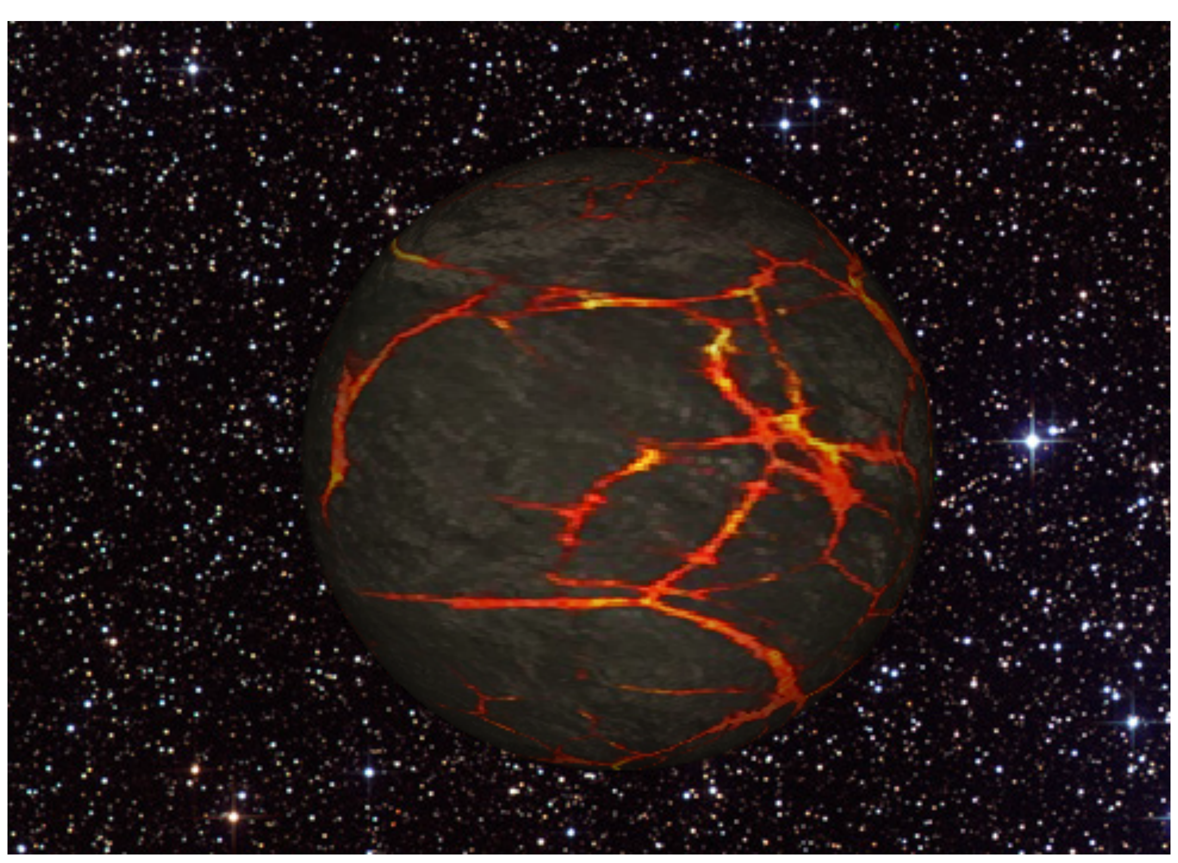
Brightness Curve

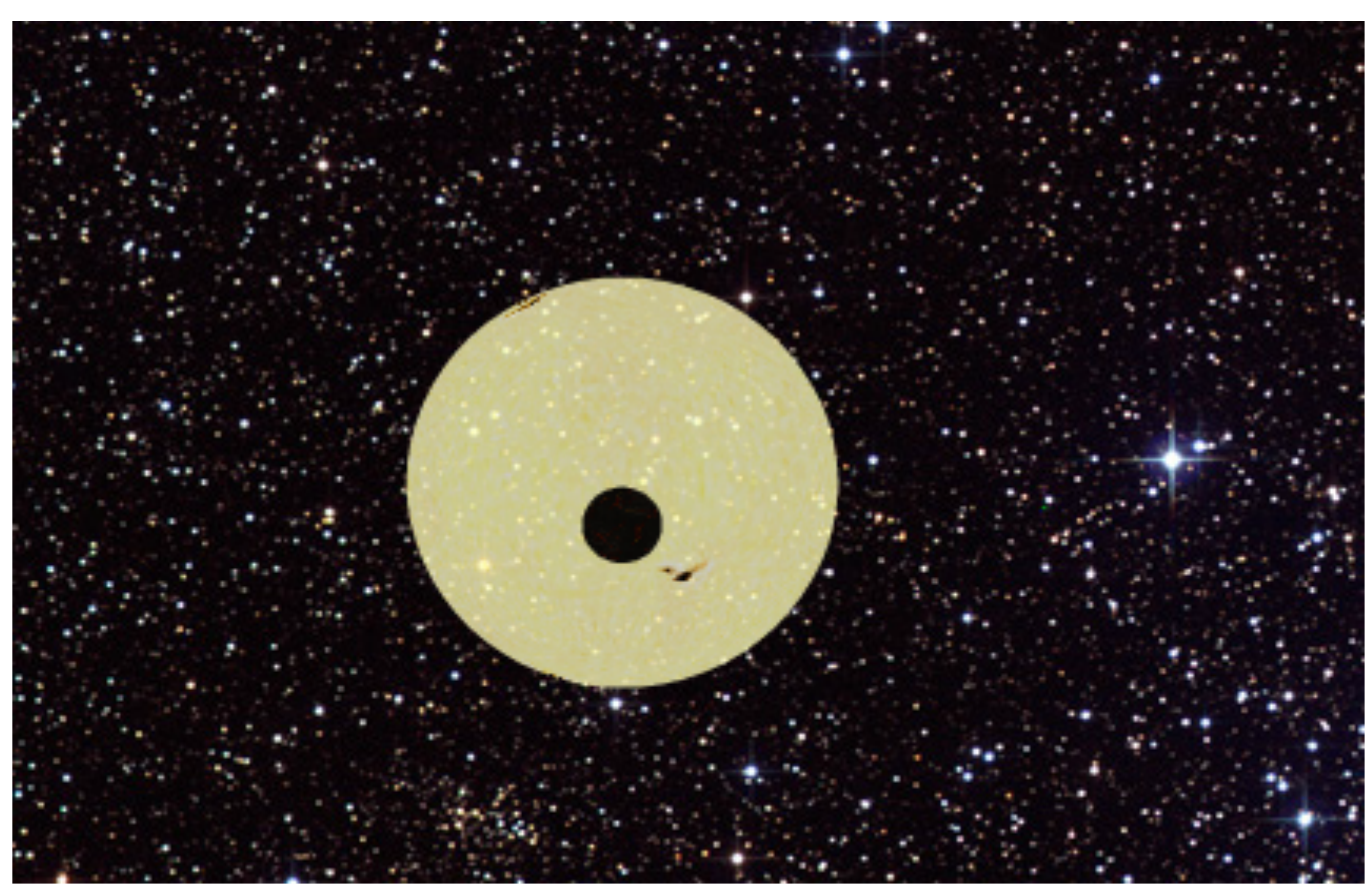


Methodology

We used the transit method to detect this planet. We focused a telescope on small portion of the sky that contained our target star. A pictures was taken every three minutes for five hours. We recorded the brightness of our target star, HAT-P-32, over about five hours at night. We compared this brightness to the brightness of two comparison stars that do not have planets. We plotted the brightness of the target star on a graph to see if there was any visible change in brightness. In order to estimate the distance from our solar system to that of HAT-P-32 b and its host star HAT-P-32, we used an image taken of our sun, adjusted for the filter and difference in exposure time, and estimated the distance at about 757 light-years. This is way off. In order to make our estimates, we assumed that the sun and HAT-P-32 have the same brightness and other properties, but they don't. HAT-P-32 is brighter than our sun (For Nnenna and Cassie: real distance is 1044 ly. the two stars actually have quite a big difference in surface temperatures. And HAT-P-32 is F/G spectral type while the sun is G2V. meaning HAT-P-32 is brighter.)

The planet's transit is about three hours long. The transit is shown by the dip in the brightness curve. This dip means that within these hours, the light coming from the star dimmed a bit as the planet passed in front of it.





Our exoplanet is about twice as wide as Jupiter, but less massive. It's gaseous. It's about 15 million miles away from its star, which means that it's much closer to its star than Mercury is to our own Sun. Because of this, it is very hot, and the surface is probably molten, making it uninhabitable. Its transit crosses the middle of its star (0° from our own point of view).