Validation of Exoplanet Candidate TOI-6034.01

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A planet is a celestial body that orbits a star. Thousands of exoplanets (planets outside of our solar system) have been discovered to date, with many additional candidates identified by missions such as TESS (Transiting Exoplanet Survey Satellite). In this research, I aimed to confirm the existence of an exoplanet candidate in the system TOI-6034.01 and to characterize its physical properties using the transit method. Ground base observations were essential to provide higher spatial resolution and improve Signal-to-Noise Ratio (SNR) compared to TESS data. Observations of the candidate were carried out using the Large Array Survey Telescope (LAST). The collected data consisted of 409 individual images of the host star, taken over a total of approximately 1.5 hours. The images were used to construct a light curve, enabling the of changes in the star's brightness over time. The resulting light curve shows a clear dip in brightness, indicating the presence of an orbiting object transiting in front of the star. From the analysis of the light curve, the planet's radius was estimated to be approximately 1.5 times that of Jupiter, with an orbital distance of 0.02724 AU. The planet's equilibrium temperature was estimated to be about 740 K, suggesting that it is too hot to support liquid water, and therefore it lies outside the habitable zone of its host star. The findings confirm that the star TOI 6034 hosts an exoplanet. While the photometric data provide strong evidence for its existence, additional spectroscopic observations are required to determine its mass and further constrain its physical properties.

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