

Follow Up Observations of TESS Exoplanets Using the Union College Observatory: Extended Mission



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1. Verify the target star and sources of the TESS detected event
2. Identification of situations that might cause the TESS detected event to be a "False Positive."
3. Confirmation of TESS events
4. Help refine ephemerides

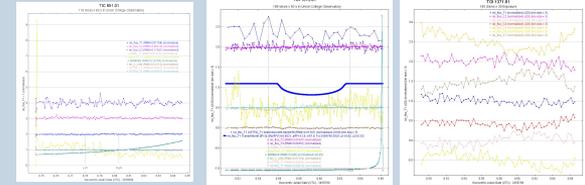
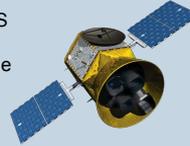


Fig 5-7: Light curve of TOI and comparison stars

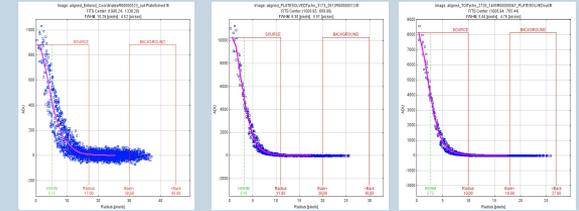


Fig 8-10: Seeing profiles of each of the TOIs

Abstract

We are members of the TESS Observing Program Working Group (TFOP) in collaboration with other universities and observatories around the world in an effort to help in the extensive follow up observations needed for the Targets of Interest (TOI) of NASA's Transiting Exoplanet Survey Satellite (TESS). We contribute seeing-limited photometry where the goal is to provide time-series photometric observations that can remove false positives due to nearby eclipsing binary stars. Using the program AstrolmageJ, we fully analyzed and submitted photometry for three TOIs. TOI 851.01 was retired as a Validated Planet Candidate. Submission of TOI 1319.01 confirmed a transit and candidate was retired as a Nearby Eclipsing Binary. For TOI 1371.01 we confirmed a partial transit and the candidate was retired as a Spectroscopic Binary. TESS mission has entered an extended mission and we continue to take observations throughout 2020.

Transcript Description

Transit – obstruction of background light as a planet passes in front of its host star as viewed by observer
 Other considerations: star spots, stellar limb darkening, orbital orientation, nearby eclipsing binary (NEB), etc.

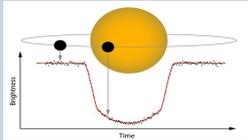


Fig 1: Generic transit of an exoplanet in front of its star with light curve graph. Typical dimming is one part in 10^2-10^4

Results

TOI 851.01	Inconclusive with Depth
TOI 1319.01	Confirmed event on target
TOI 1371.01	Confirmed partial transit

Table 1: Summary and conclusions of results of three submitted observations

Conclusions and Future Work

- Work in collaboration with other institutions on TFOP
- Observed and submitted data for three different TOI targets
- In the fall, TFOP will be following up on targets in northern hemisphere
- Plan to continue working with the follow up team throughout the mission

About TESS

- Two-year mission launched April 2018 now currently in extended mission
- First spaceborne mission to search almost entire sky for exoplanets looking at each field for 28 days
- Primary goal is to identify a large sample of small planets where follow-up observations are feasible with current and planned ground based telescopes
- Follow-up teams work to eliminate false positives



Fig 2-4: Field of view of target and Gaia Stars needed for NEB check

Acknowledgements

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