
DETECTION AND CHARACTERISATION OF TRANSITING EXOPLANETS FROM NGTS AND TESS

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EXOPLANET DETECTION: TRANSIT METHOD

- Exoplanet – planets outside Solar System
- Exoplanet passing between host star and observer
- Measurable dip in brightness
- Used to constrain planetary parameters
- Composition, classification, atmosphere and habitability



Image credit: NASA's Goddard Space Flight Centre

TESS

- **T**ransiting **E**xoplanet **S**urvey **S**atellite
- All-sky survey – 200,000 bright stars
- 26 sectors, 24x96 degrees
- Full-frame images, light curves
- TOIs (**T**ess **O**bjects of **I**nterest)
verified with ground-based follow-up



Image credit: NASA's Goddard Space Flight Centre

NGTS

- **N**ext **G**eneration **T**ransit **S**urvey
- Paranal Observatory, Chile
- Array of 12 telescopes (0.2m)
- Searching for Neptune-sized and super-Earth planets
- High precision – down to 3 Earth radii (West et al, 2019)[1]
- Follow-up on TESS transit candidates



Image credit: G. Lambert, NGTS

CURRENT AND FUTURE WORK

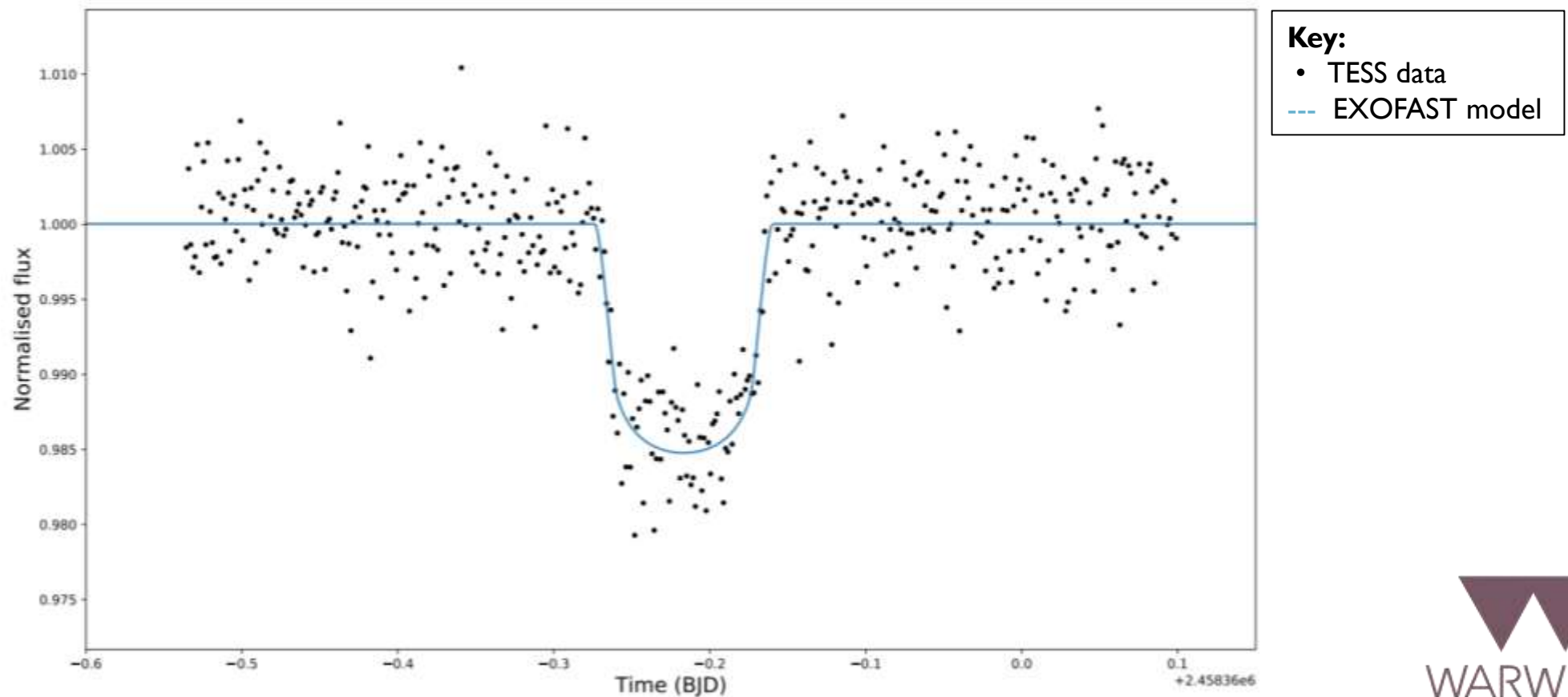
- Plotting TESS light curves (Python)
- Modelling transits in **EXOFAST**
- Using BLS algorithm to search for exoplanets in NGTS and TESS light curves
- Integrating follow-up data
- Analysing dataset in terms of Transit Timing Variations (TTVs)
- New planetary systems: **TOI-836**



Gliese-581 (artist's impression)
Image credit: ESO

HATS-30 – LIGHT CURVE (SECTOR 2)

HATS-30 light curve and transit model



THANK YOU FOR LISTENING

[1] West, R. et al, 2019. NGTS-4b: A sub-Neptune transiting in the desert. *Monthly Notices of the Royal Astronomical Society*, 486(4), pp.5094-5103.

