

NEMESIS: Exoplanet traNsit surVEy

of nearby M-dwarfs in TESS FFIS

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Project Summary

- In this work, we've analyzed over 35,000 M-dwarf stars located within 100 parsecs of Earth that were observed in TESS Sectors 1 - 5 with 30 minute cadences.
- Of those 35,000, we've identified 183 transit signals, 29 of which we've determined to be due to planetary eclipses.
- The planet candidates we've detected have planet radii ranging from 1.26 - 5.31 Earth radii and orbital periods ranging from 1.25 to 6.84 days.
- 24 of our 29 candidates are new detections!

Target Star Selection Criteria

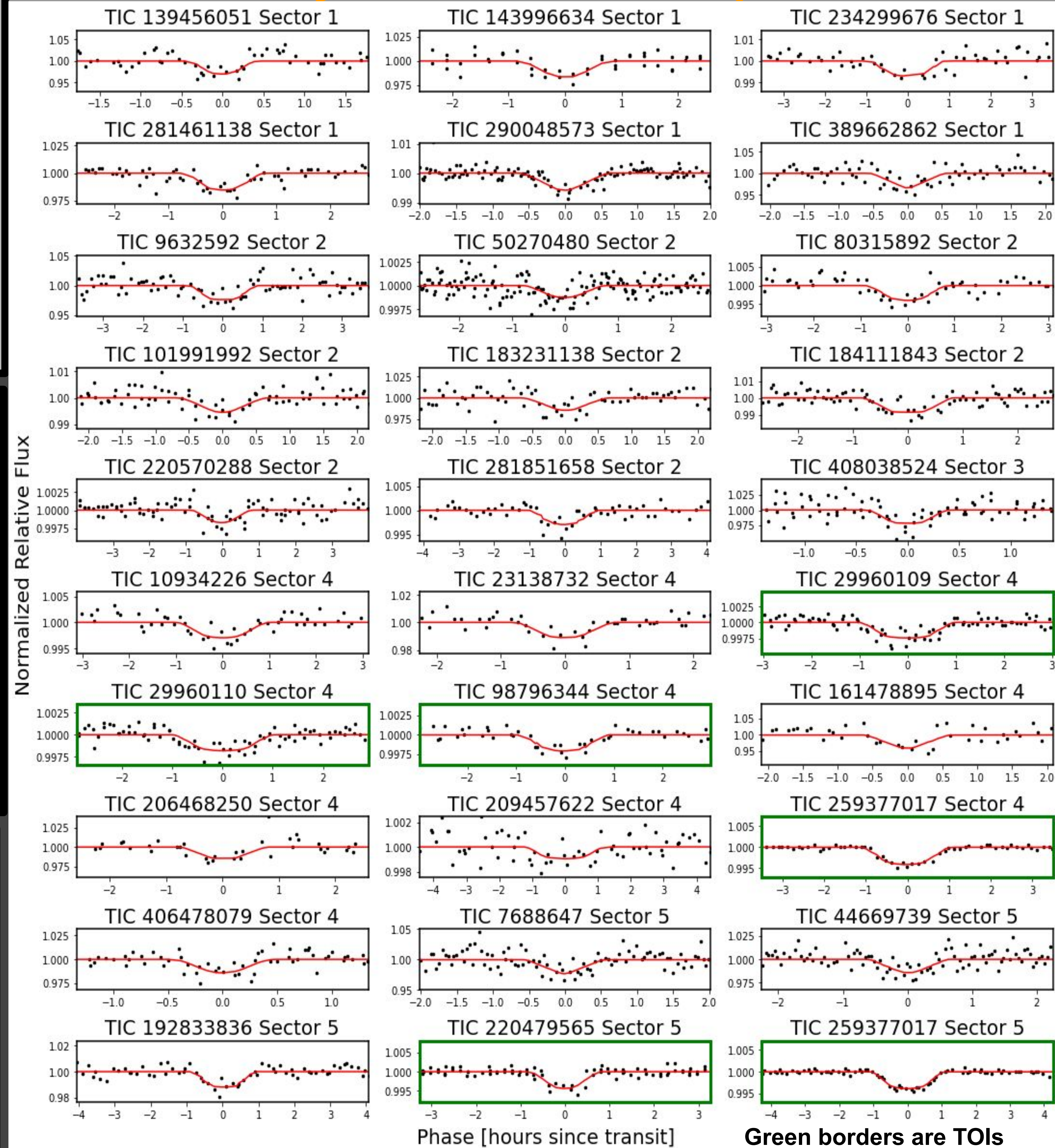
All target stars are filtered using stellar parameters from TIC v8

- 2300 K < Effective Temperature < 4000 K
 - Stellar Radius < 0.5 Solar Radius
 - Stellar Mass < 0.5 Solar Mass
 - Logg > 3
 - Distance < 100 parsecs
- Targets are also cross referenced with the TESS Candidate Target List (CTL, Muirhead et al. 2018).

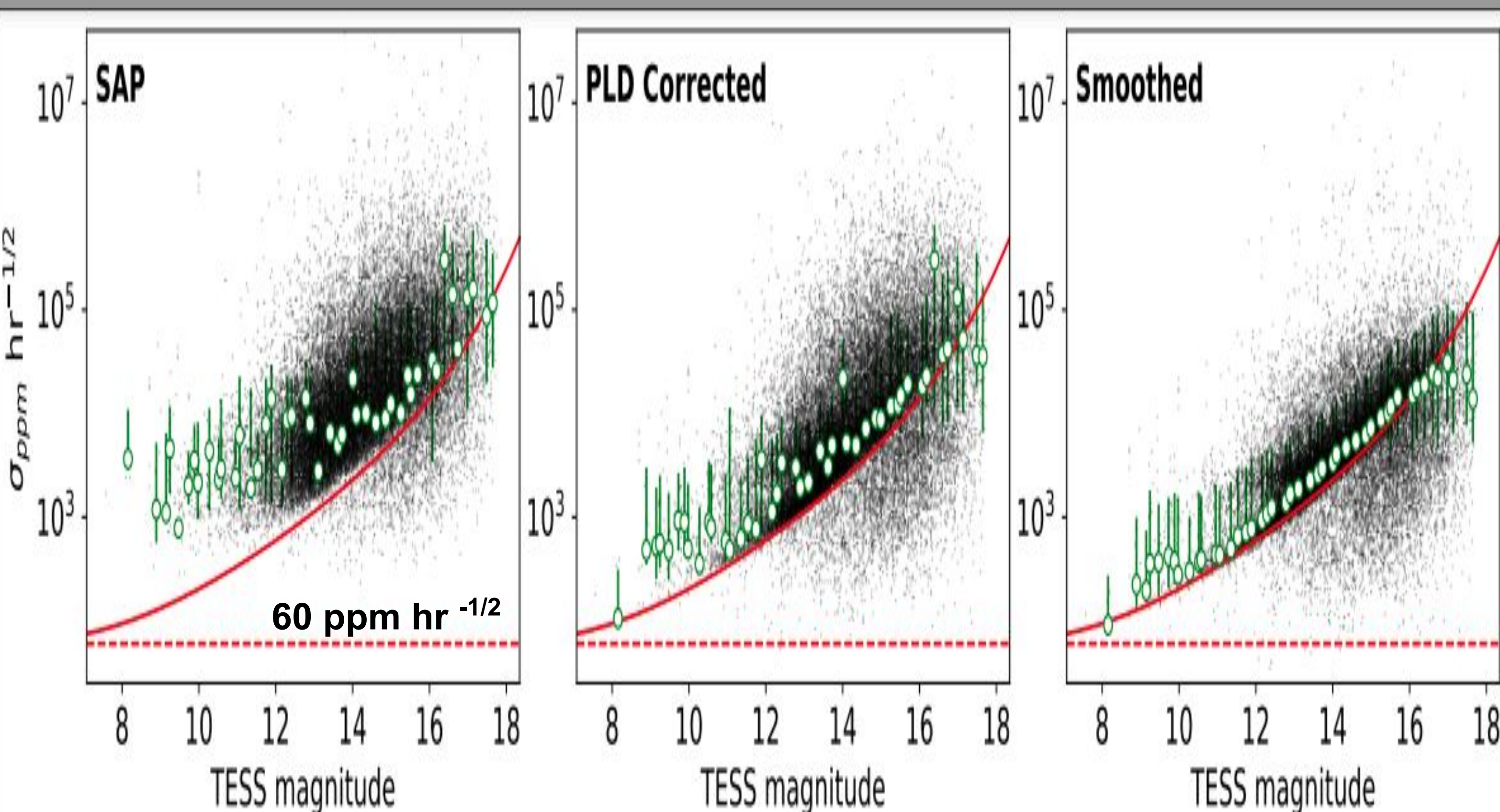
From Images to Photometry to Transit Detection

- Extract Raw photometry and remove short term instrumental effects by using a Pixel Level Decorrelation (PLD) algorithm based on Deming et al. 2015
- Remove long term stellar variations with a time-windowed median based smoothing function (Wötan, Hippke et al. 2019a).
- Once the photometry is extracted and cleaned, we then perform an algorithmic search using Transit Least Squares (Hippke et al. 2019b) for the period range 1 - 9 days.

Gallery of Detected Exoplanets



NEMESIS Photometric Precision



All Confirmed Transiting Exoplanets and Candidates for M-dwarf hosts
Observed in TESS Sectors 1 - 5 and within 100 parsecs

