Strategies for Confirmation and Characterization of Long Period Planets in TESS

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credit:NASA SVS
Science Goals

Improve statistics for the mass-radius relation of small planets as a function of distance from host stars

Eccentricity distribution of warm/cold Neptunes

Obtain a closer-to-complete picture of the architecture of multi-planet systems

Temperate planets among which to select the best for atmospheric characterization with the JWST/ELTs

Increase the sample of circum-binary planets

A few candidates for future direct imaging observations (with measured radius!)

Larger sample of warm/cold Jupiters for formation studies (obliquity + eccentricity distributions) and their relationship to hot Jupiters
Recovery rate for planet radius vs. period

- Warm inflated Jupiter
- Warm Jupiter
- Temperate Jupiter
- Warm Saturn

Xinyu Yao
One Hit Wonders
PI: Carl Ziegler

0.5-m aperture telescope
Diffuser assisted photometry
Fully autonomous operation
On-the-fly pipeline, rapid triggers
Deploying to New Mexico later this month
Recover ~20 Northern TESS single transits in next year
Places to look for archival RVs
(But make sure you check that they were reduced in a systematic way!)

http://archive.eso.org/wdb/wdb/adp/phase3_main/form

https://dace.unige.ch/dashboard/

https://ebps.carnegiescience.edu/data
Take-aways:

Long-period planets, including singles, are interesting, if not difficult

Single transits are becoming abundant in TESS

1/2 to 3/4 of singles transits will be recovered by the extended mission

Constrain the periods when possible

Use archival data when possible

Prioritization scheme is needed: ease of follow-up vs scientific interest vs unique

People want to collaborate!
Stop Collaborate and Listen

Thanks Carl!
Ask these people questions!