

# Constraining Parameters of TOI-4616.01 With TESS and Ground-Based Telescope SAINT-EX

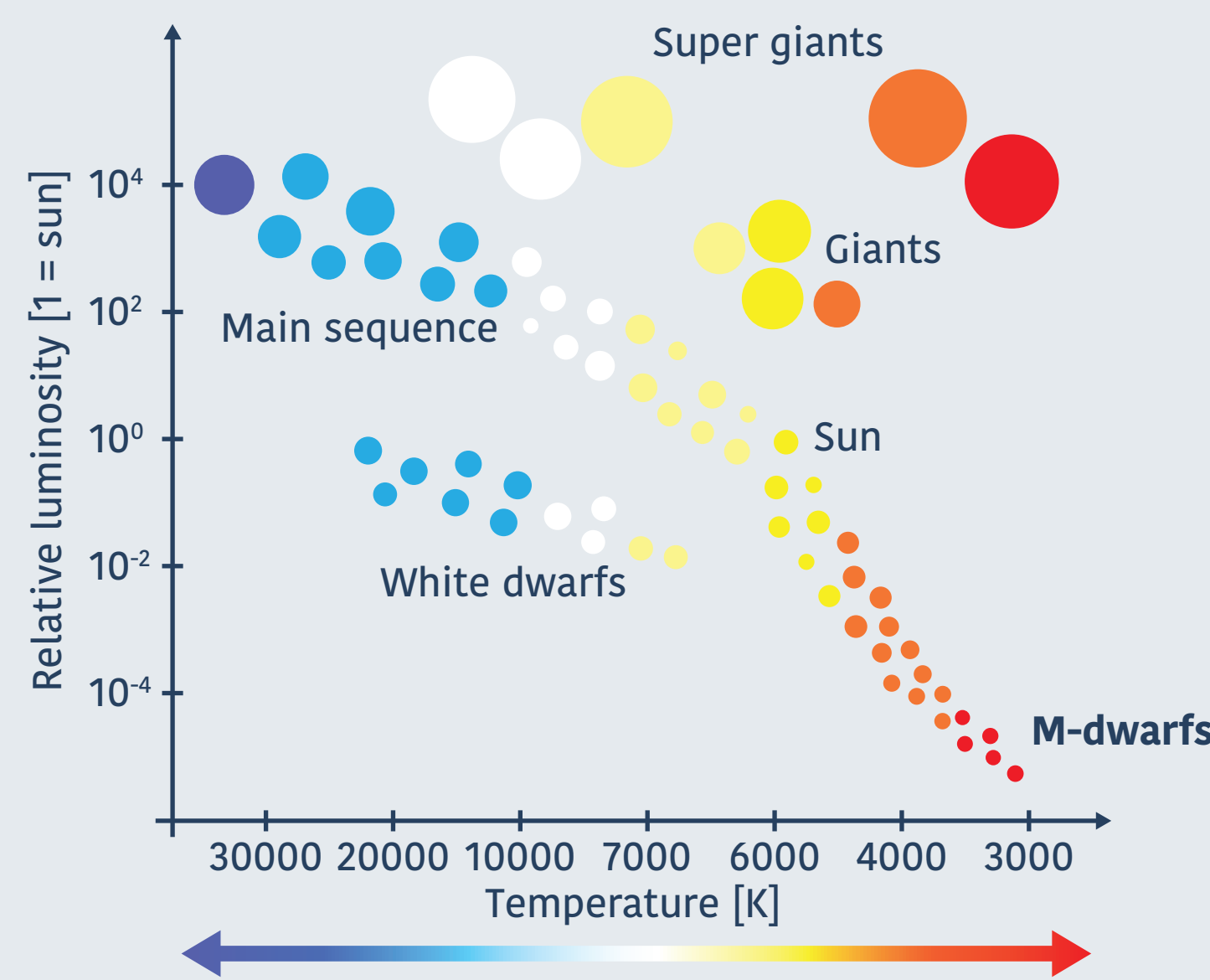


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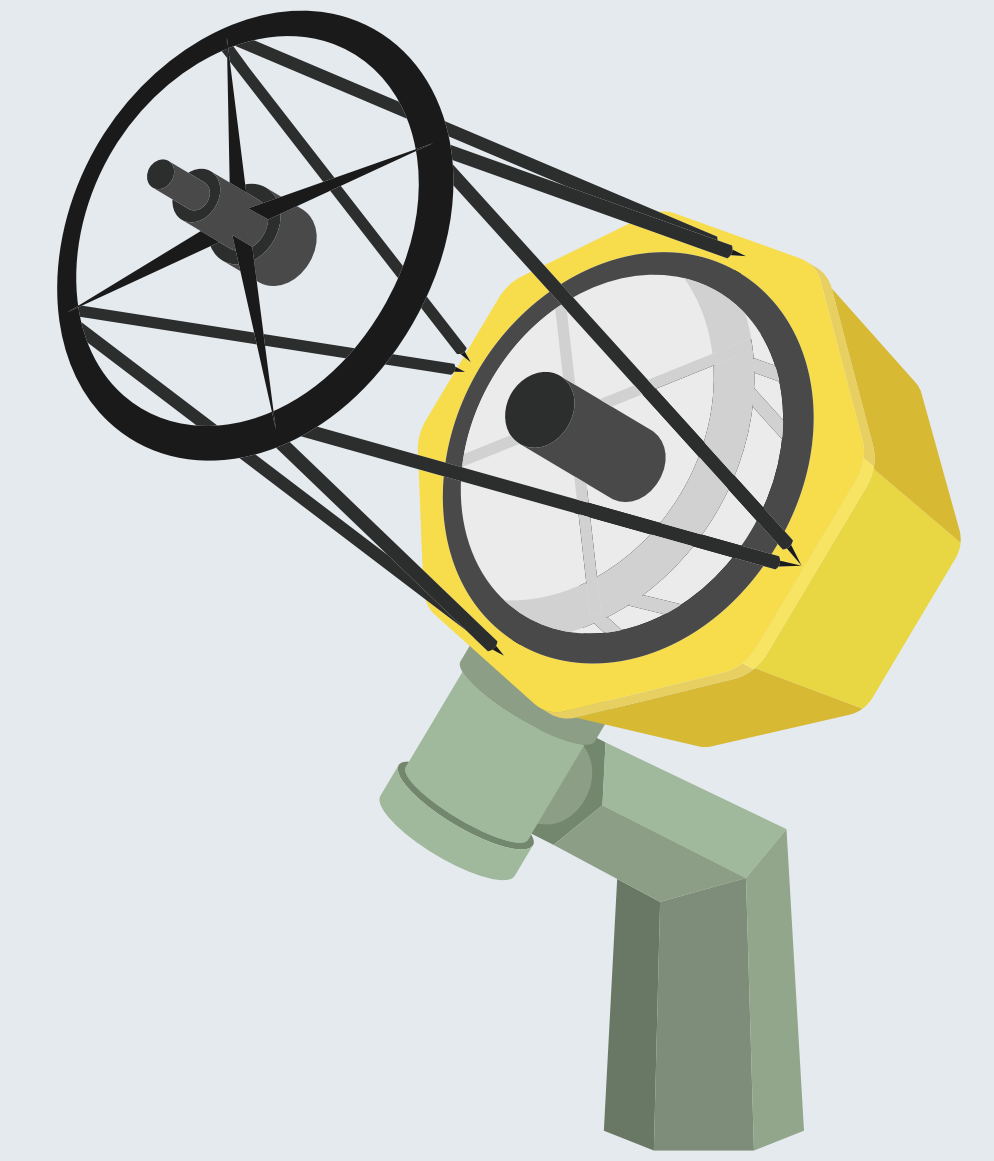
## Background:

- Rocky exoplanets are abundant around cool stars like M-dwarfs
- Both, theoretical models and observations have shown that these exoplanets have the propensity to lie in the habitable zone
- The proximity of such planets to their star provides the opportunity for atmospheric characterization
- Our target system, TOI-4616, has an M-dwarf in its centre



## Ground-Based Telescope SAINT-EX:

- Located in San Pedro Mártir, Mexico
- Altitude: 2830 m MSL
- First light in January 2019
- Fully robotic 1 m Ritchey-Chrétien telescope
- Wavelength regime: I+Z bands
- Designed for the transit detection and parameter characterization of terrestrial exoplanets orbiting ultra-cool M-dwarfs
- Ground-based support to the ESA CHEOPS mission



## Parameters derived with SAINT-EX:

### Period:

**1.553827 d**  
± 0.000011 d

### Transit duration:

**0.036233 d**  
± 0.002043 d

### Planet radius:

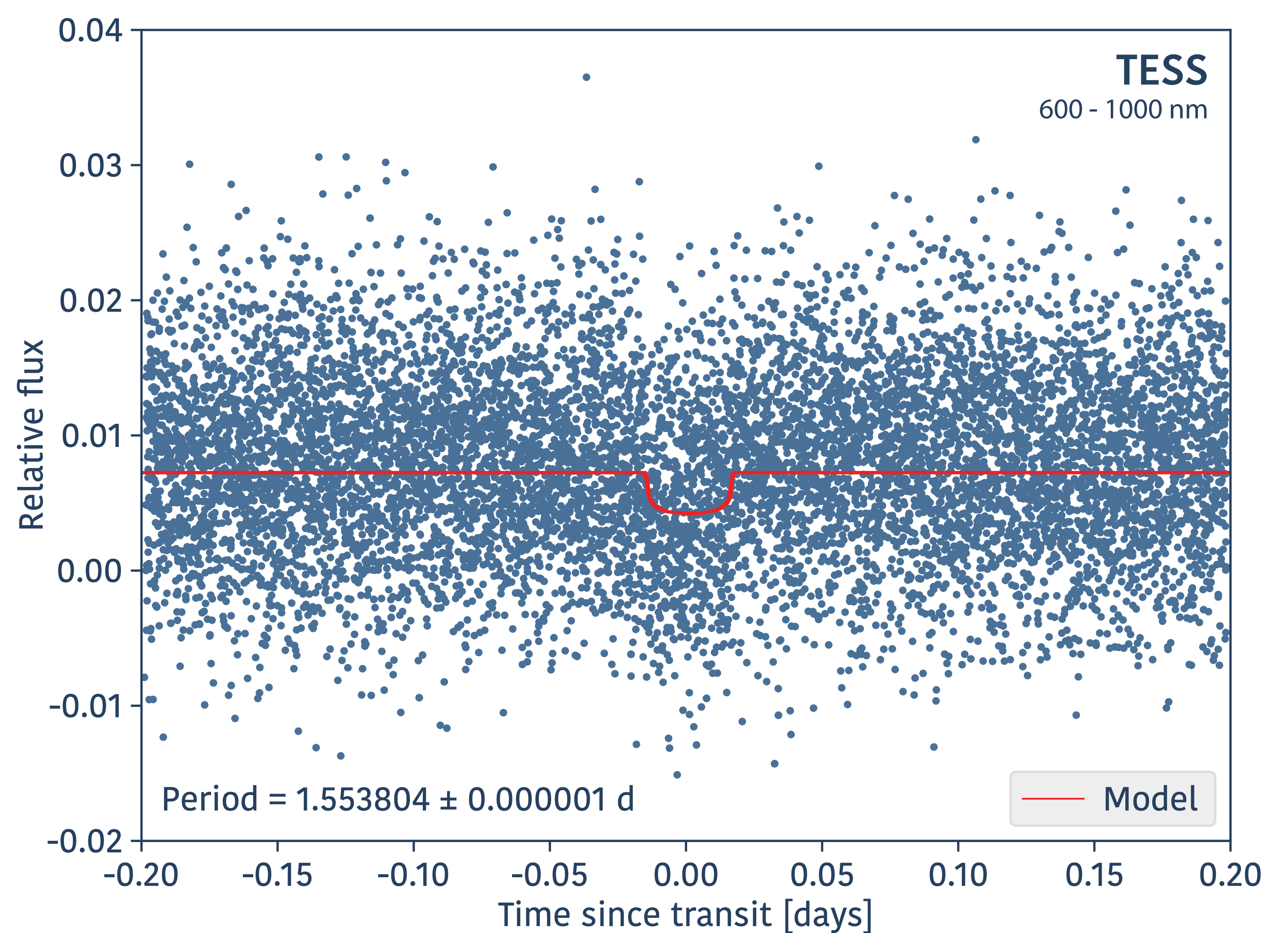
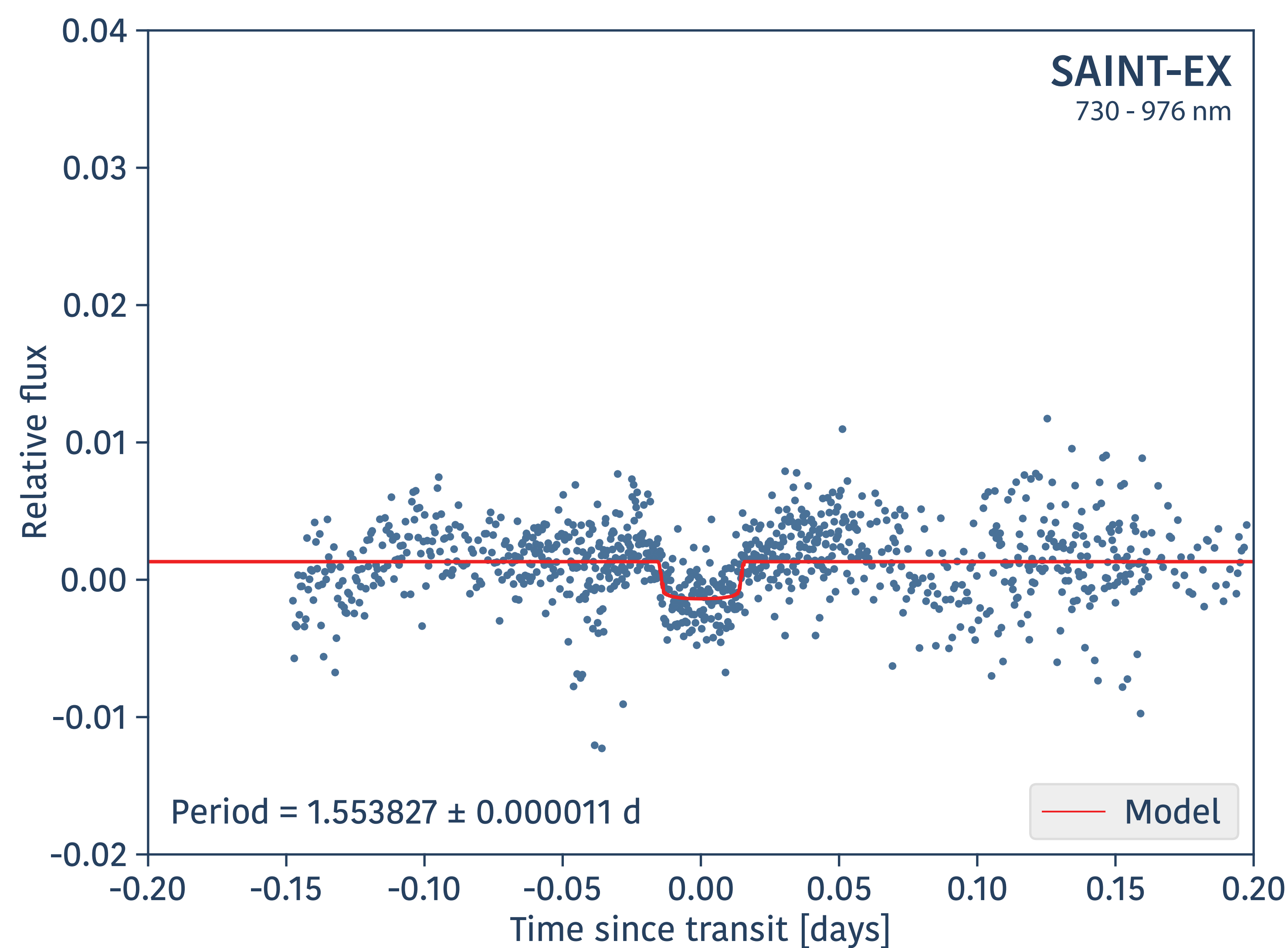
**1.222316 R<sub>⊕</sub>**  
± 0.792072 R<sub>⊕</sub>

### Effective radius ratio:

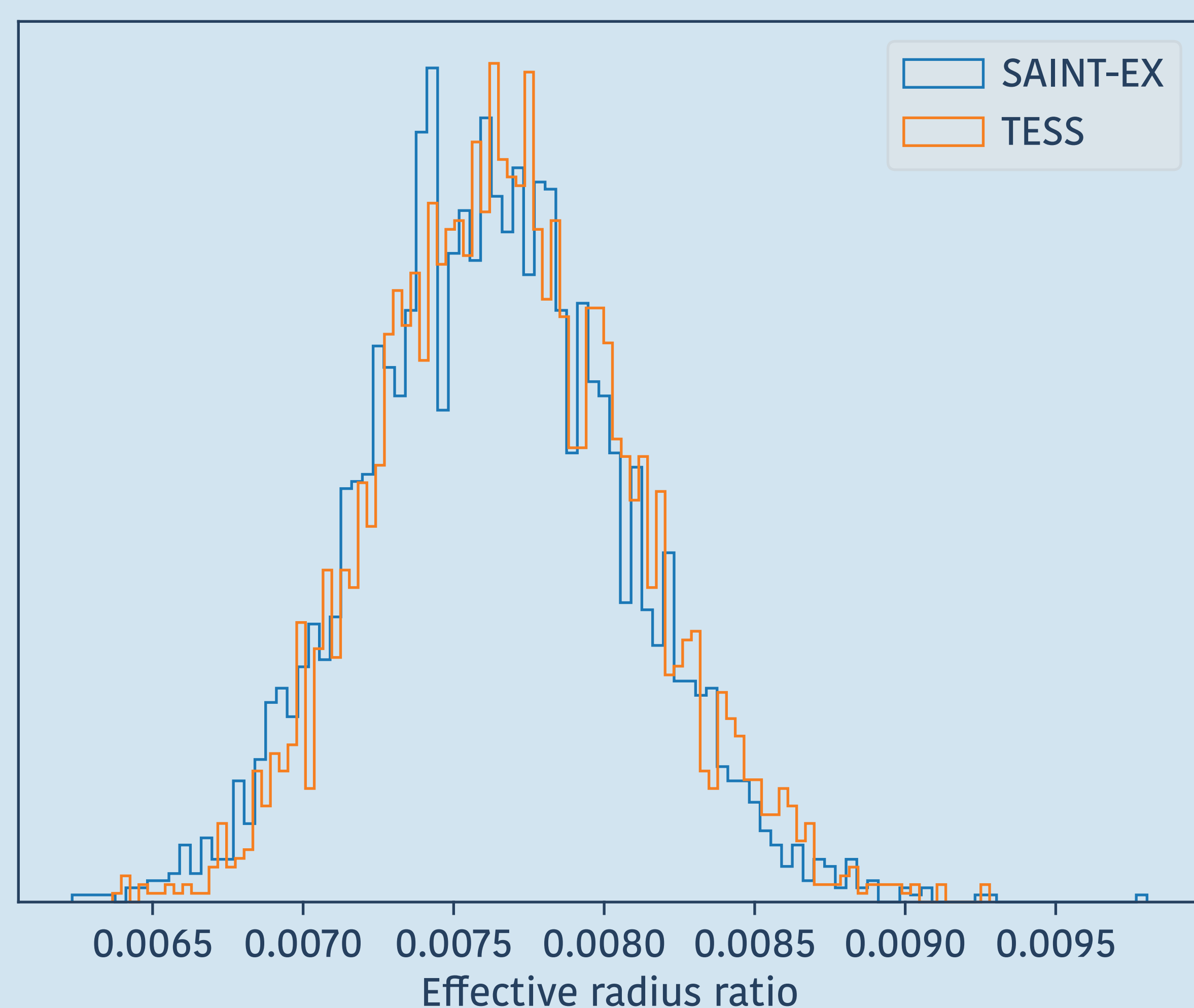
**0.007637**  
± 0.000431

### Impact parameter:

**0.587905**  
± 0.097636



## Posterior Distribution of Transit Depth:



## Summary:

- Detection of a transit using SAINT-EX and confirmation with TESS shows existence of TOI-4616.01
- The folded light curves and transits from both data sets confirm an **orbital period of 1.554 days**
- The posterior distribution of the transit depth from both data sets have a significant area of overlap

## Outlook:

- Further monitoring of the system when the star returns to the observable night sky in a few months
- Comparison to data of other telescopes
- Calculation of the TSM and determining if more detailed observations using JWST will be necessary

## Project funded by:



## Reach out to me:

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