A DANCE WITH DRAGONS

TESS REVEALS ALPHA DRACONIS IS AN ECLIPSING BINARY

ANGELA KOCHOSKA

VILLANOVA UNIVERSITY

Key authors

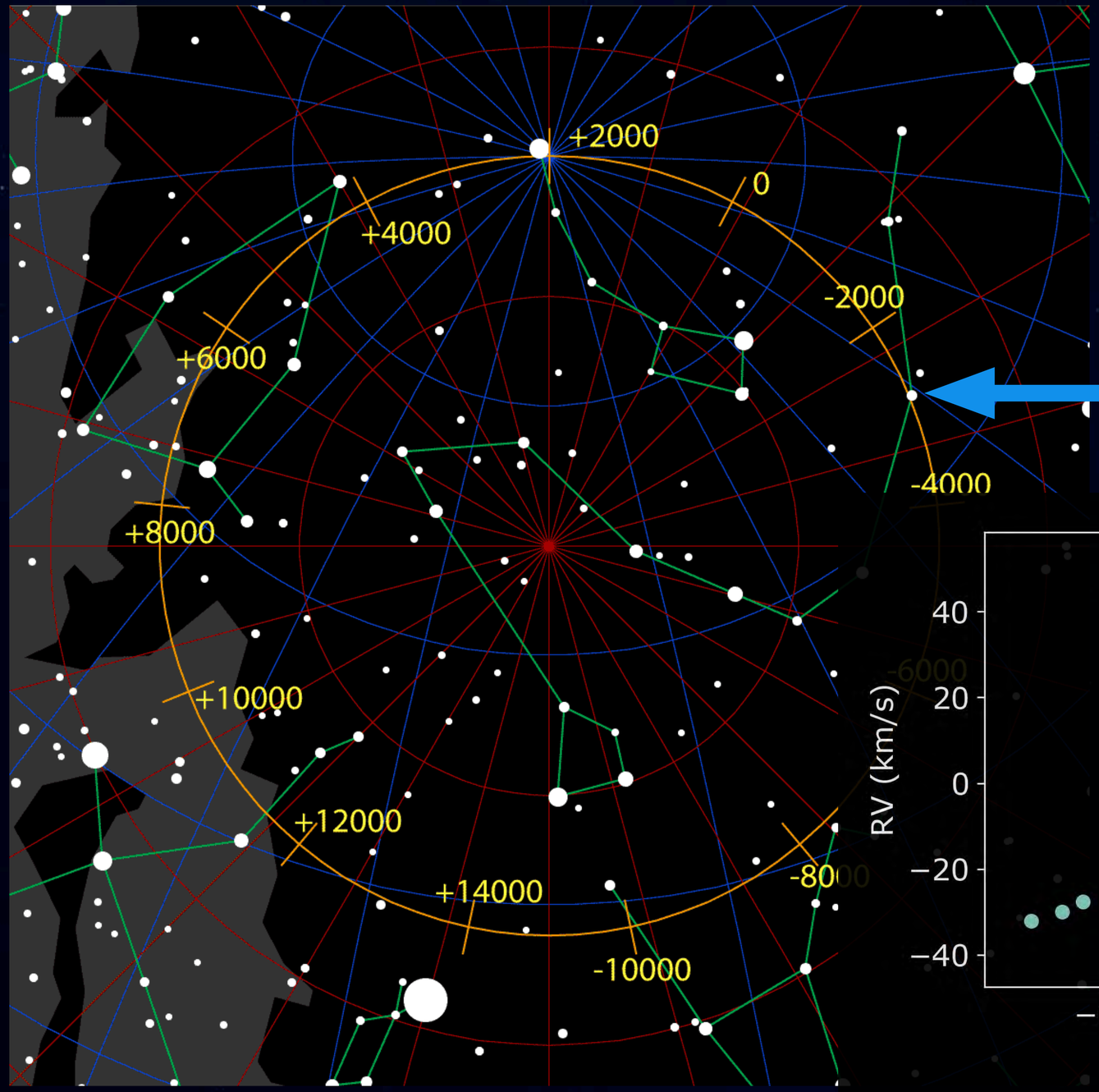
Daniel Hey Richard Monier
Simon J. Murphy Timothy R. White
Timothy R. Bedding John Southworth

AARHUS UNIVERSITY

THE UNIVERSITY OF SYDNEY

uclan University of Central Lancashire

Email: angela.kochoska@villanova.edu *Phone*: (215) 403-1280



STAR

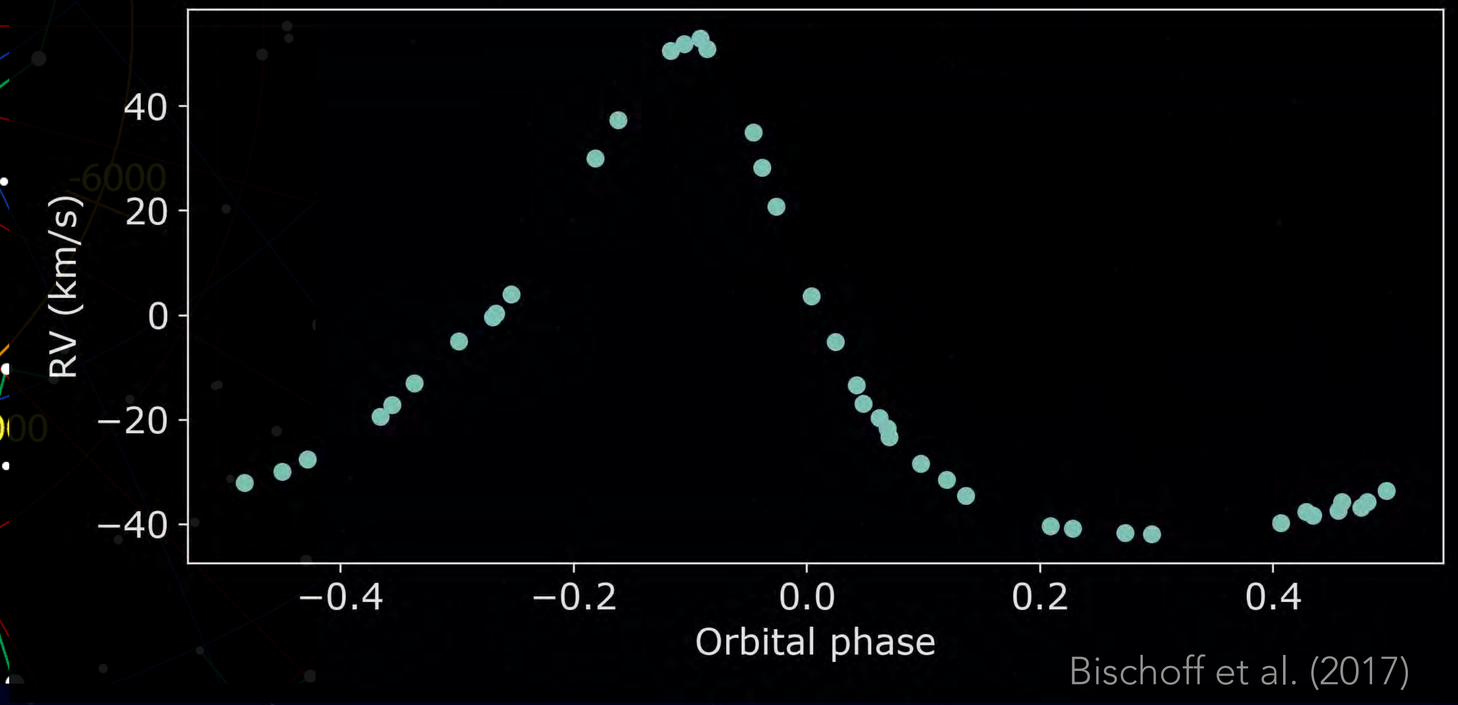
Magnitude (V) = 3.68
Distance: ~270 ly
Spectral type: AIII0

Chemically peculiar subgiant (HgMn star)

BINARY SYSTEM

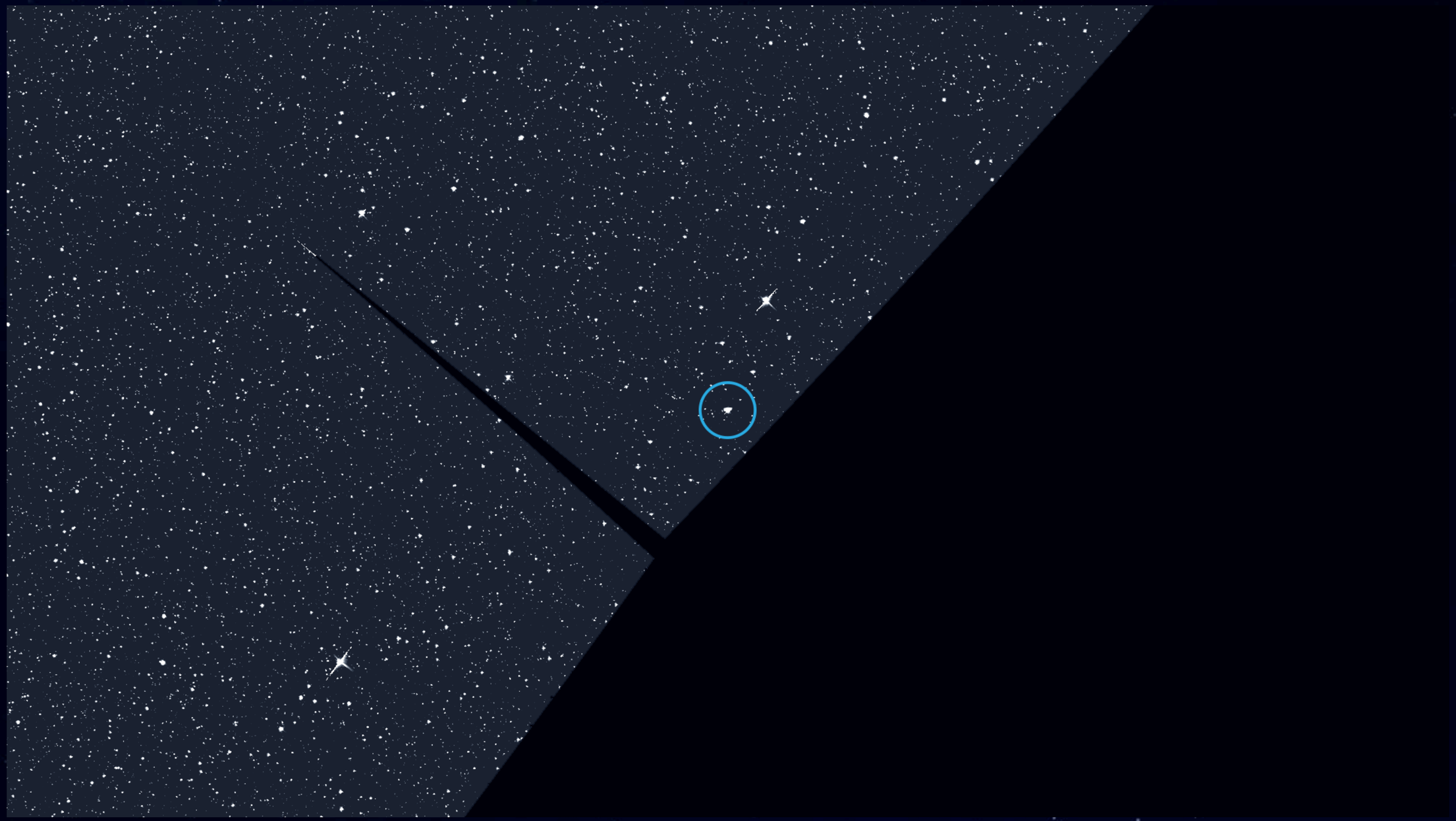
Period = 51.4 days
Eccentricity = 0.43

secondary 5 times fainter than primary (interferometry)



Bischoff et al. (2017)

Why look at TESS data for Alpha Draconis?



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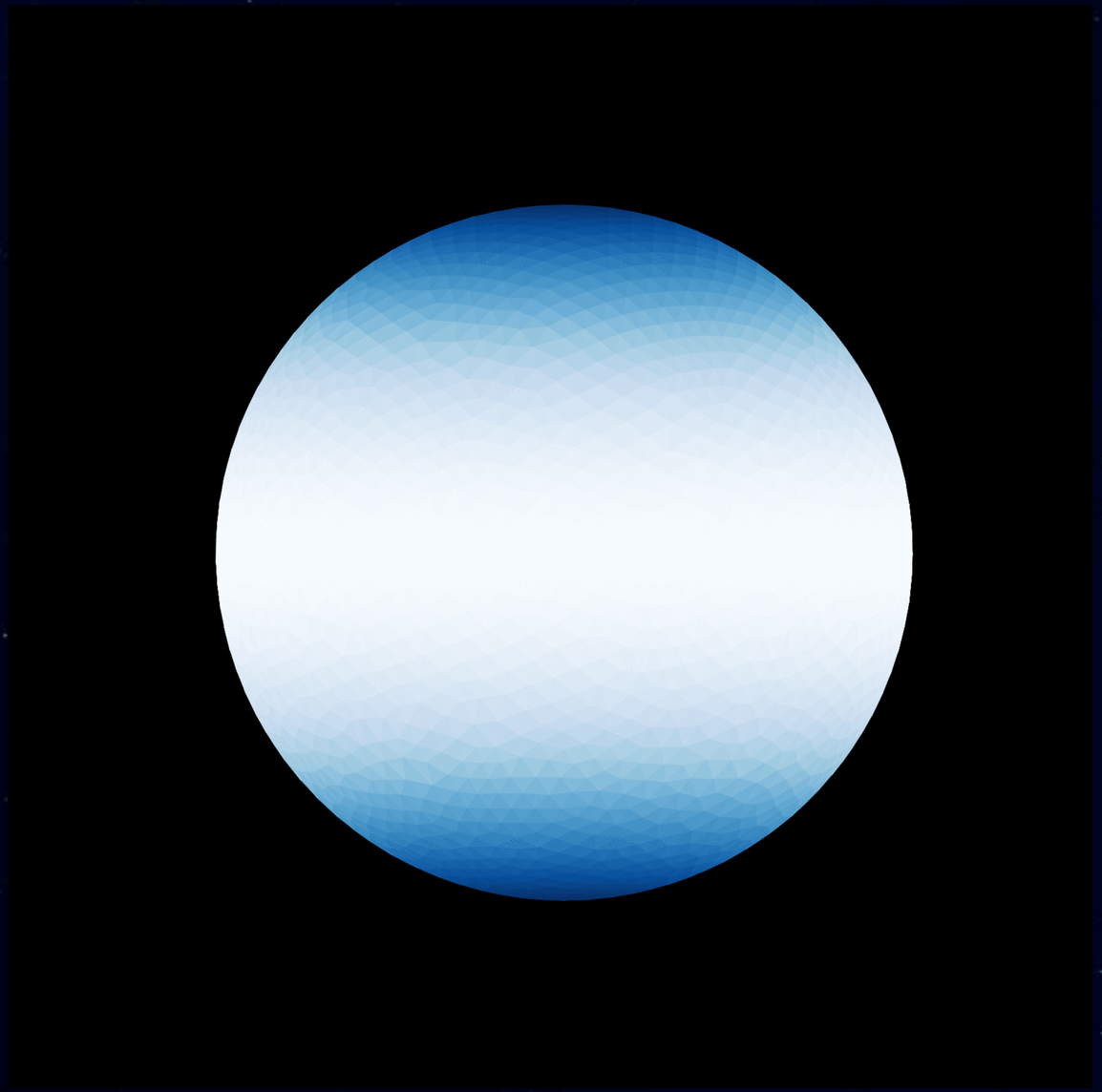


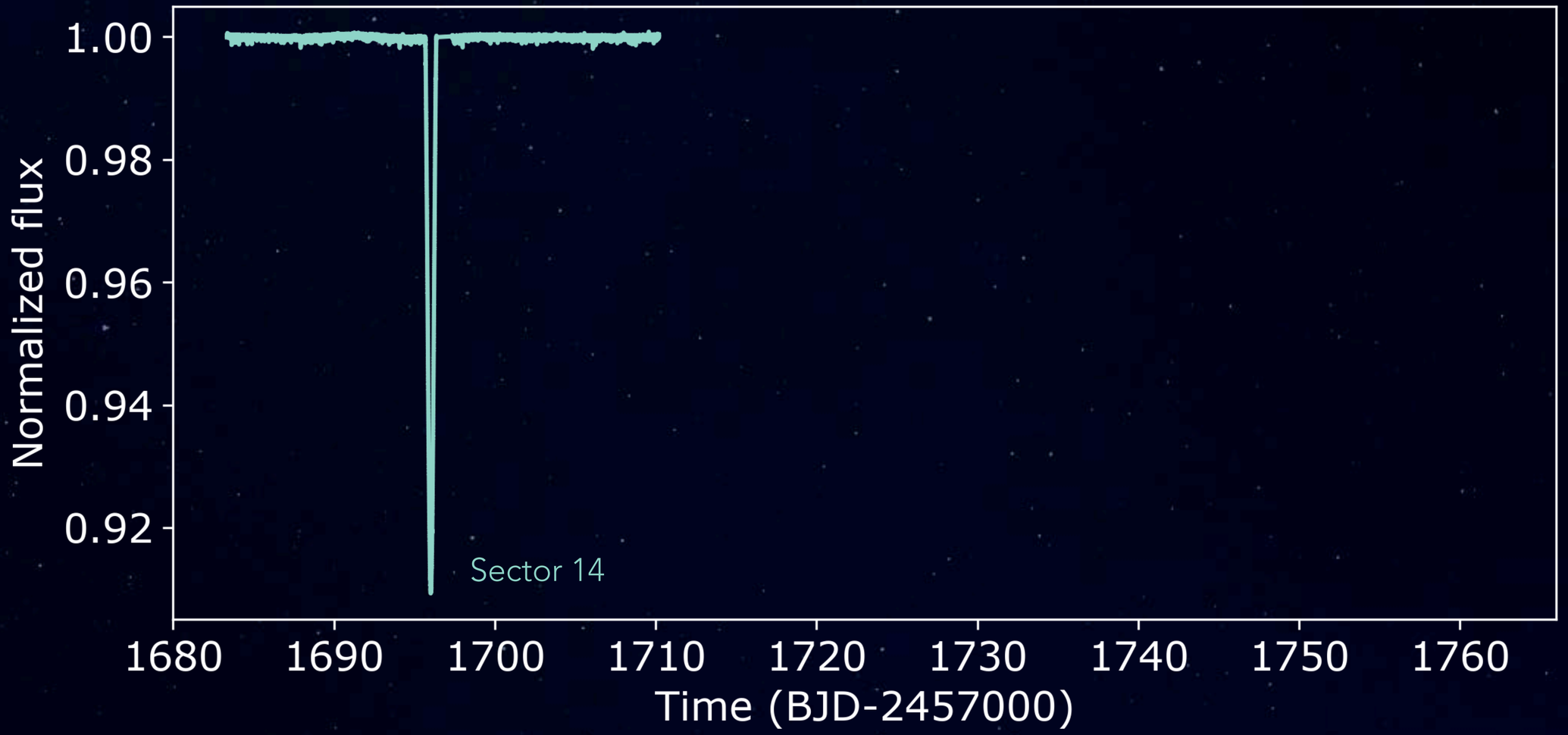
Pulsating?

Kallinger et al (2004)

No evidence of pulsations in TESS data

But we found something even more exciting!

IT'S ECLIPSING!



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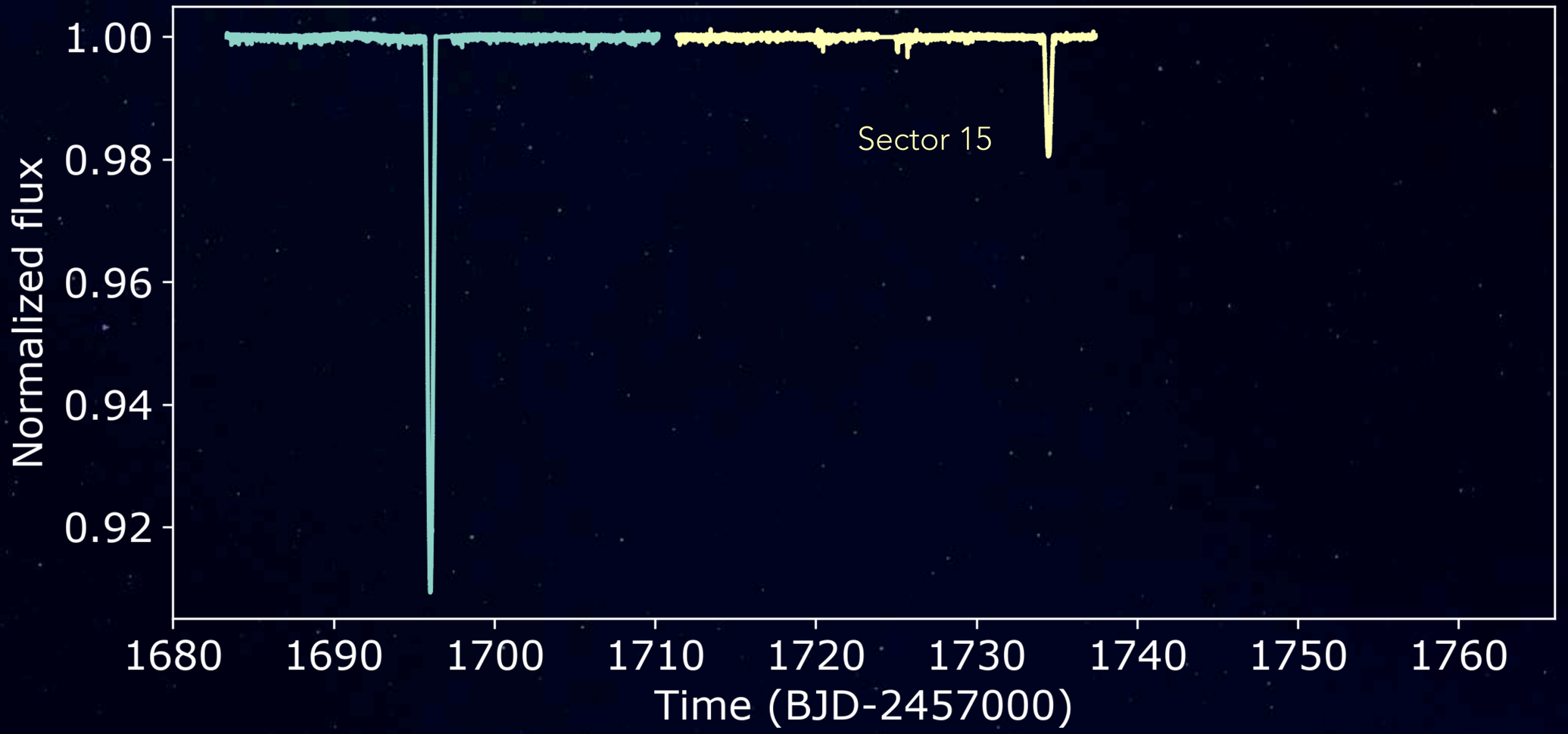

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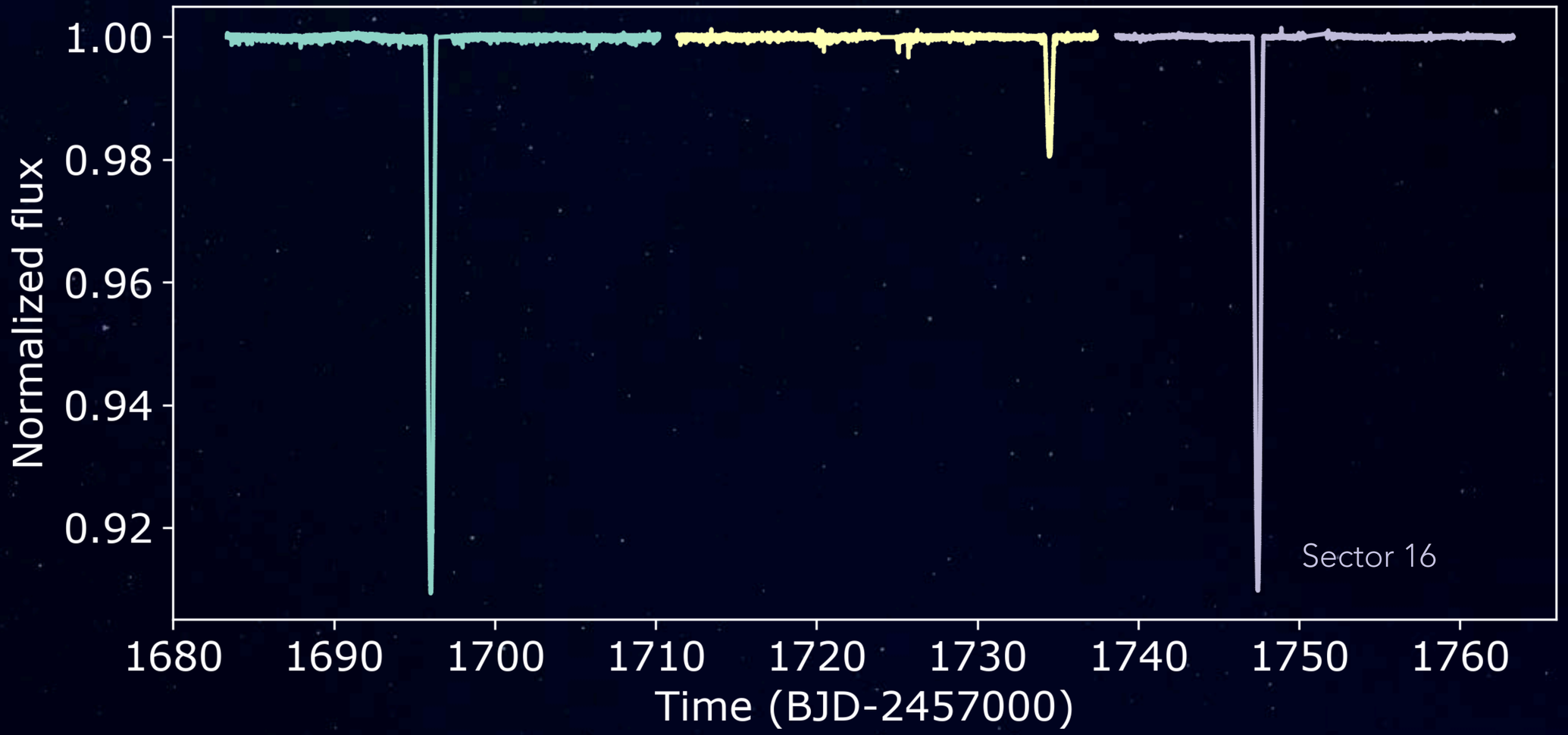
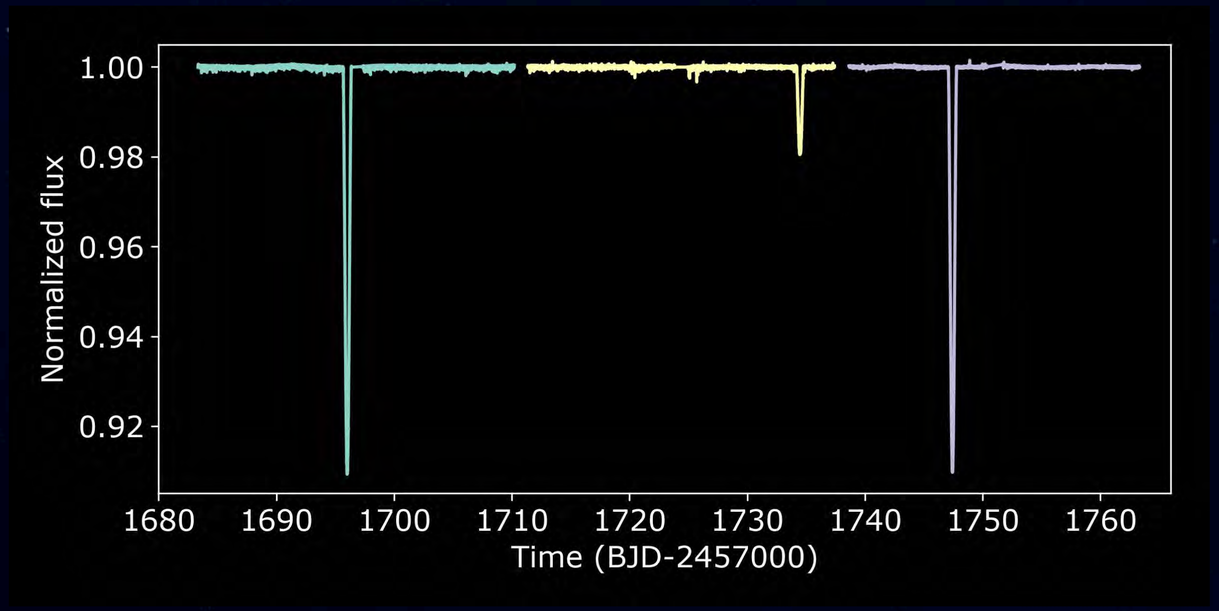


Why is this important?



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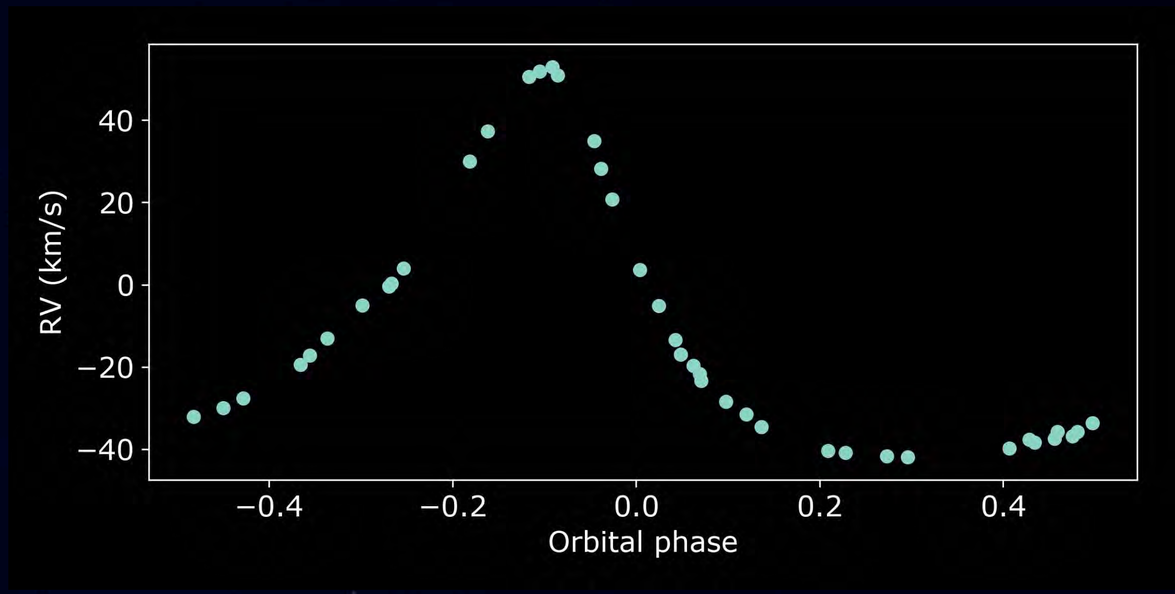
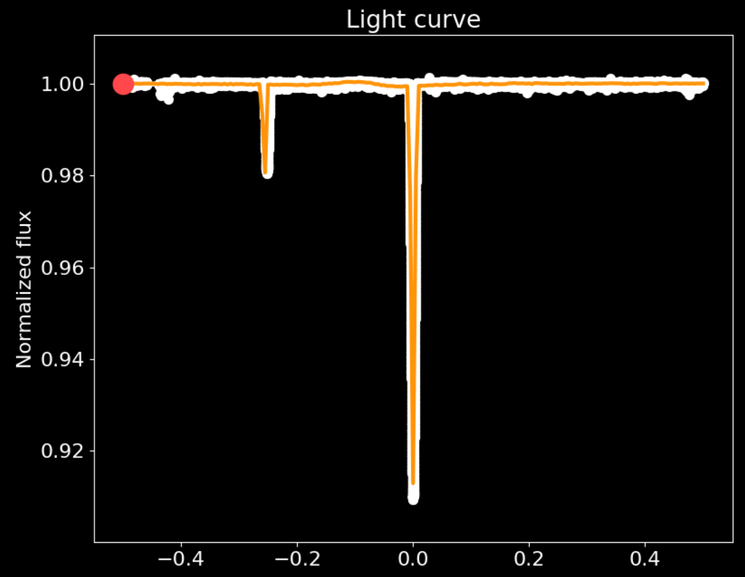
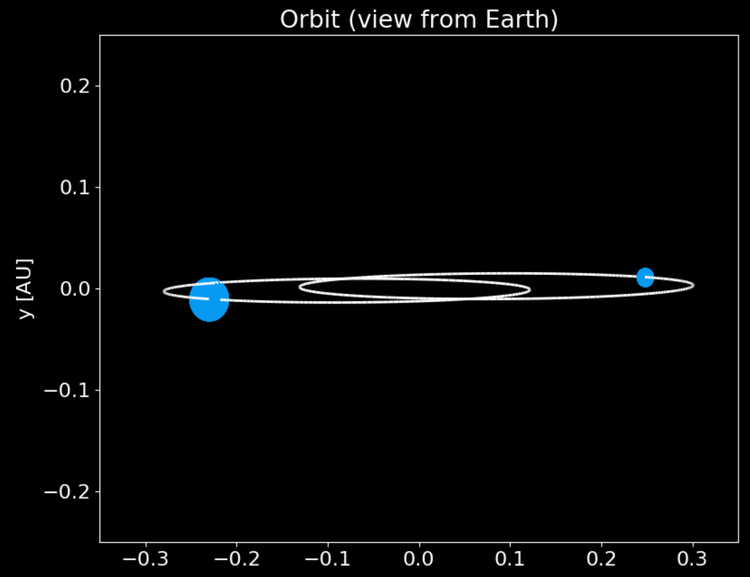
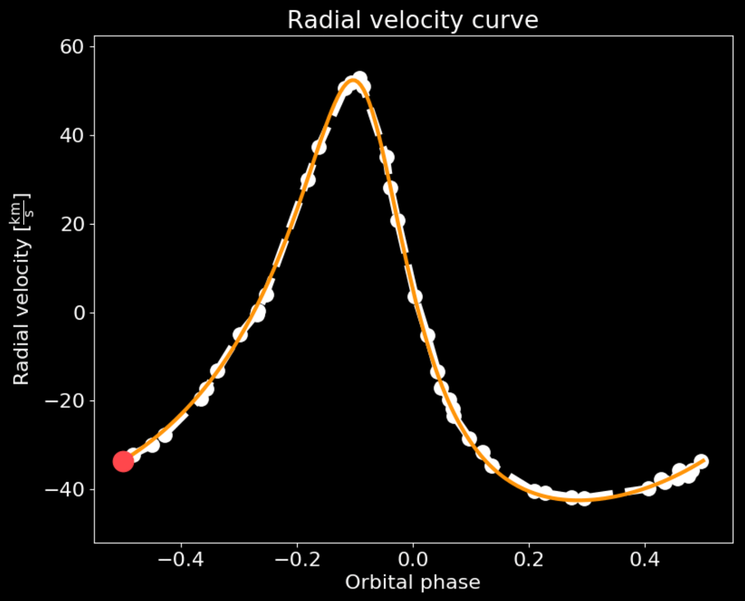


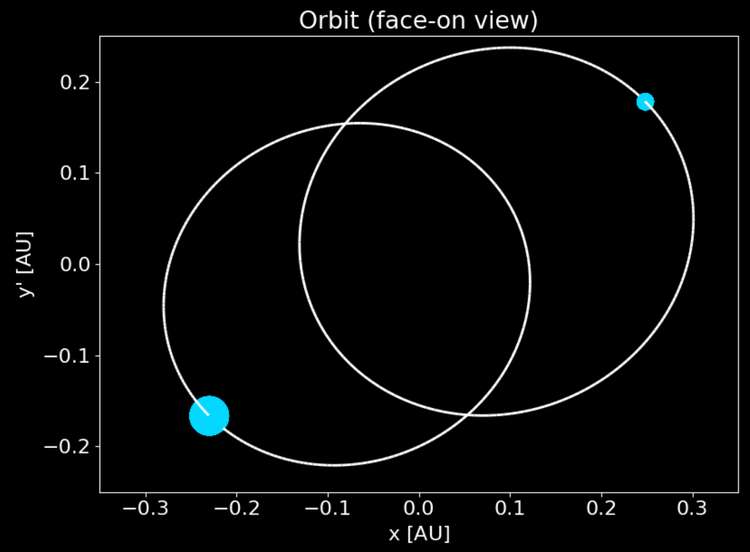
- fractional radii
- inclination
- surface brightness ratio
- eccentricity
- photometric mass ratio
- semi-major axis
- mass ratio (if double-lined)

= ABSOLUTE MASSES, RADII AND LUMINOSITIES!









PRELIMINARY MODEL

ORBITAL PARAMETERS

period = 51.4 days

eccentricity = 0.43

semi-major axis ~ 0.4 AU

inclination ~ 87 deg

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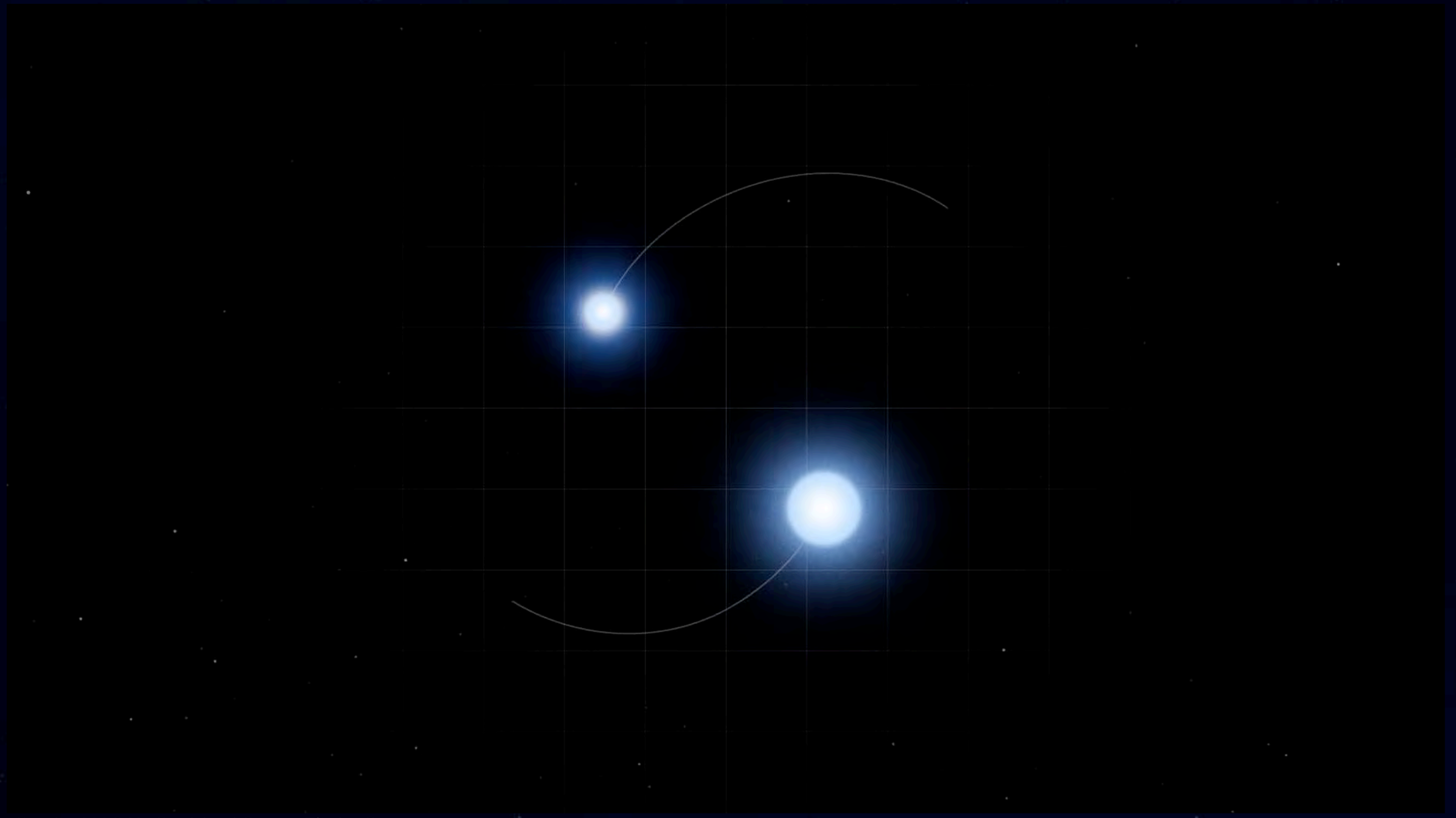

Credit: NASA's Goddard Space Flight Center

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STAR PARAMETERS

R_1 ~ 4 Solar radii

R_2 ~ 2 Solar radii

T_{eff1} ~ 10,000 K

T_{eff2} ~ 8,000 K

Ongoing: ground-based follow-up spectroscopy

- Secondary contribution in the spectra?
- Element abundance analysis

Future prospects

- Additional TESS data modeling
- Gaia parallax to better constrain the luminosity

Bright detached eclipsing binaries with TESS

- TESS data can help constrain the fundamental stellar parameters to an unprecedented level!

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