The search for circumbinary planets

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matthew.standing@esa.int

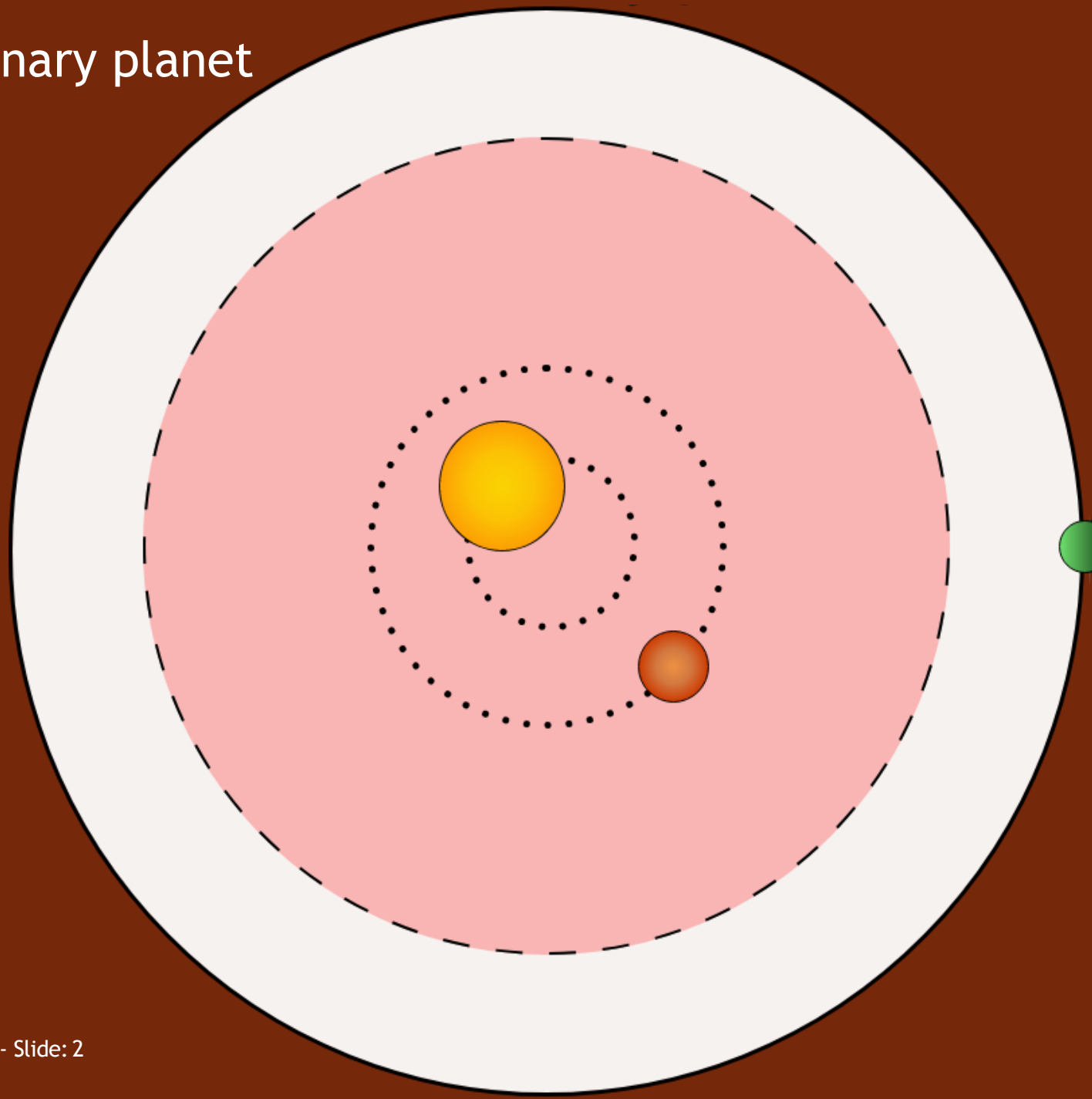
Matthew R. Standing

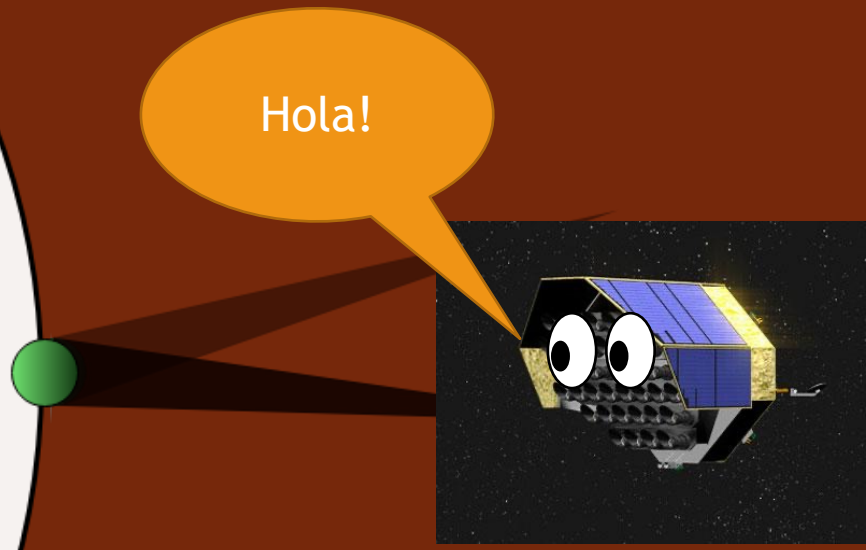
Research Fellow (ESAC)

SSW Aranjuez 23/01/24

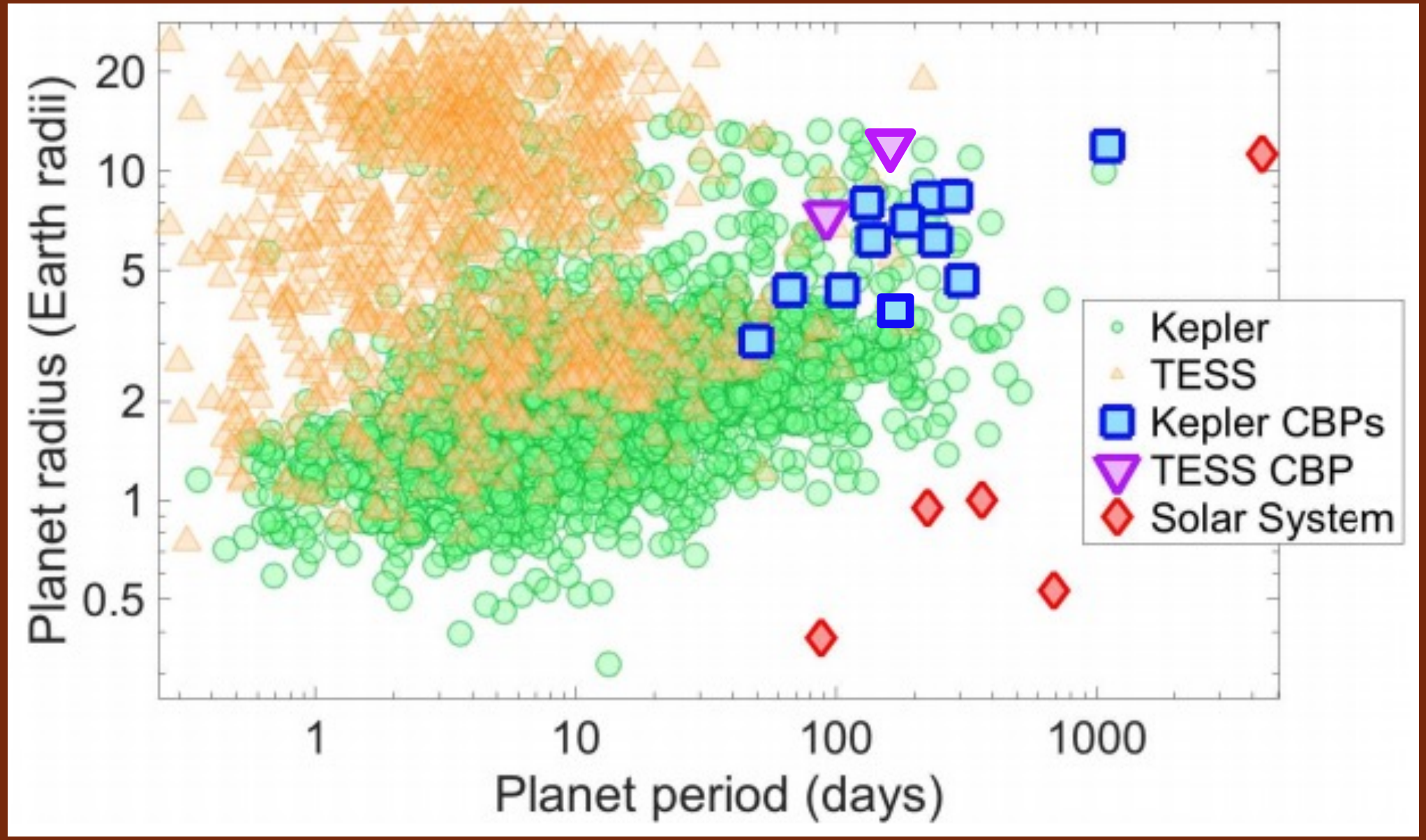
GIF: Johnson, Rian, dir. **Star Wars** Episode VIII: The Last Jedi. Lucasfilm Ltd., 2017. **Film**

Circumbinary planet
(P-type)



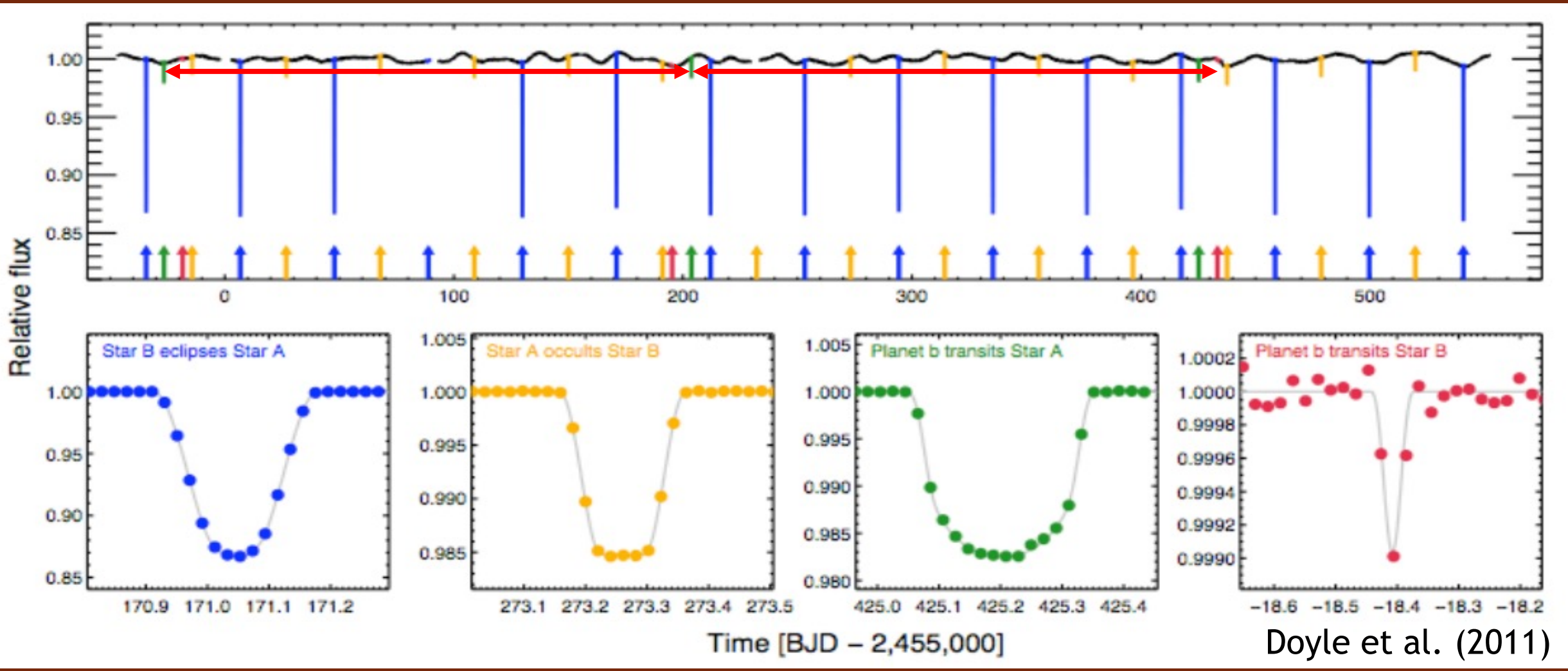


Holman & Wiegert (1999)



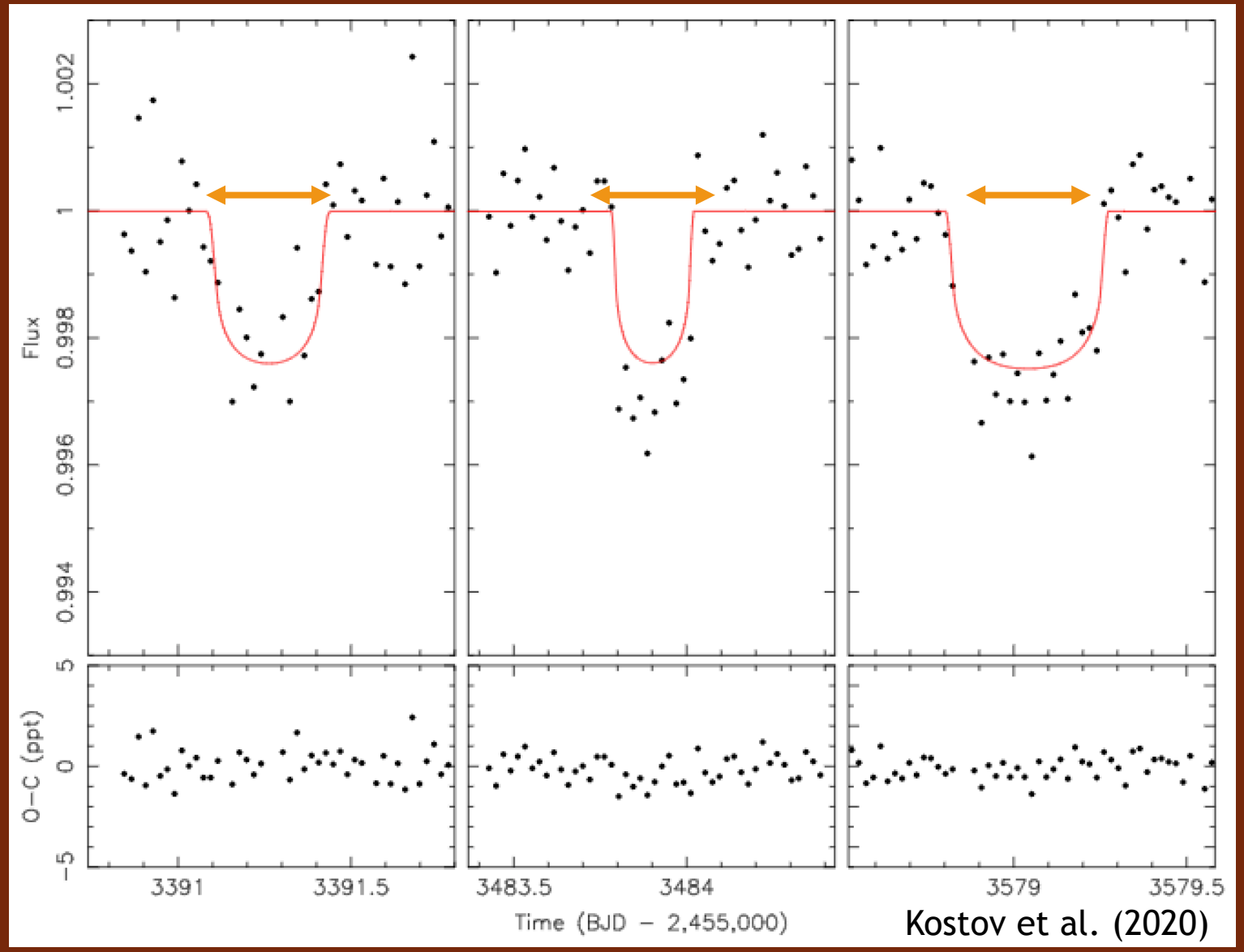
Kostov et al. (2020)

Difficulties in detection: Transit timing



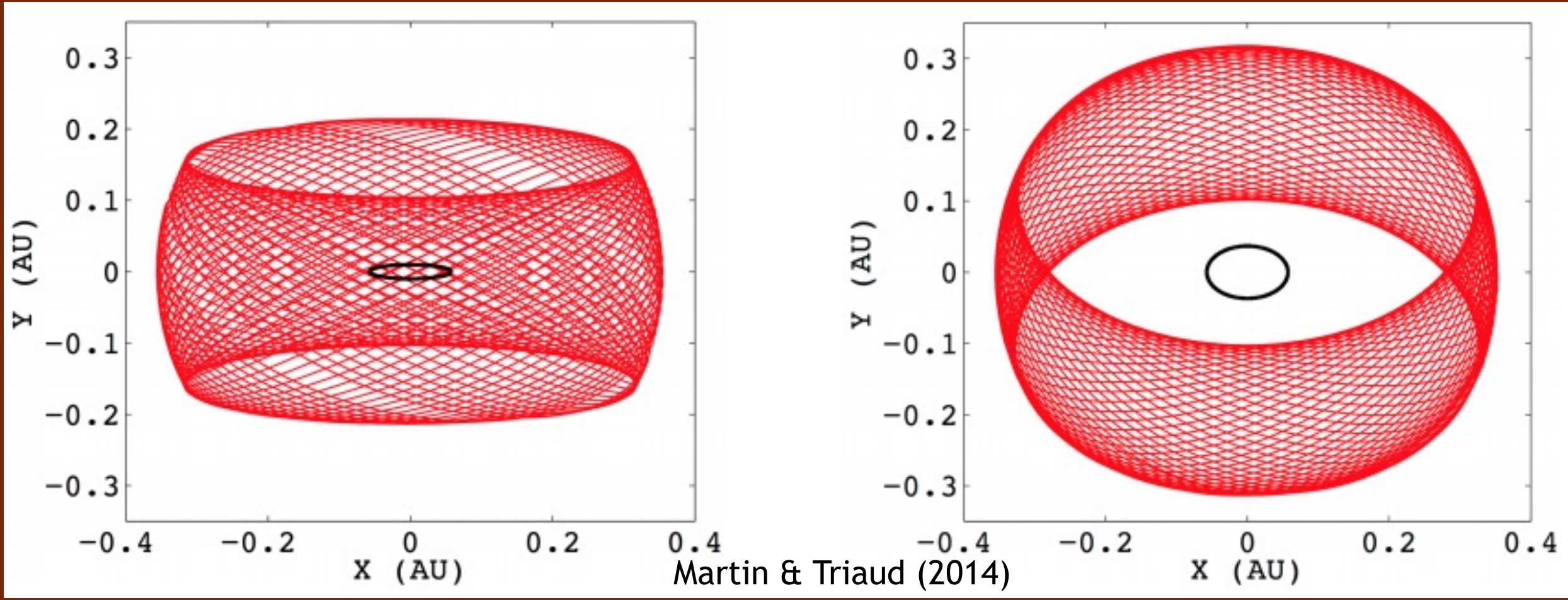
Doyle et al. (2011)

Difficulties in detection: Transit duration



Kostov et al. (2020)

Difficulties in detection: Orbital Precession



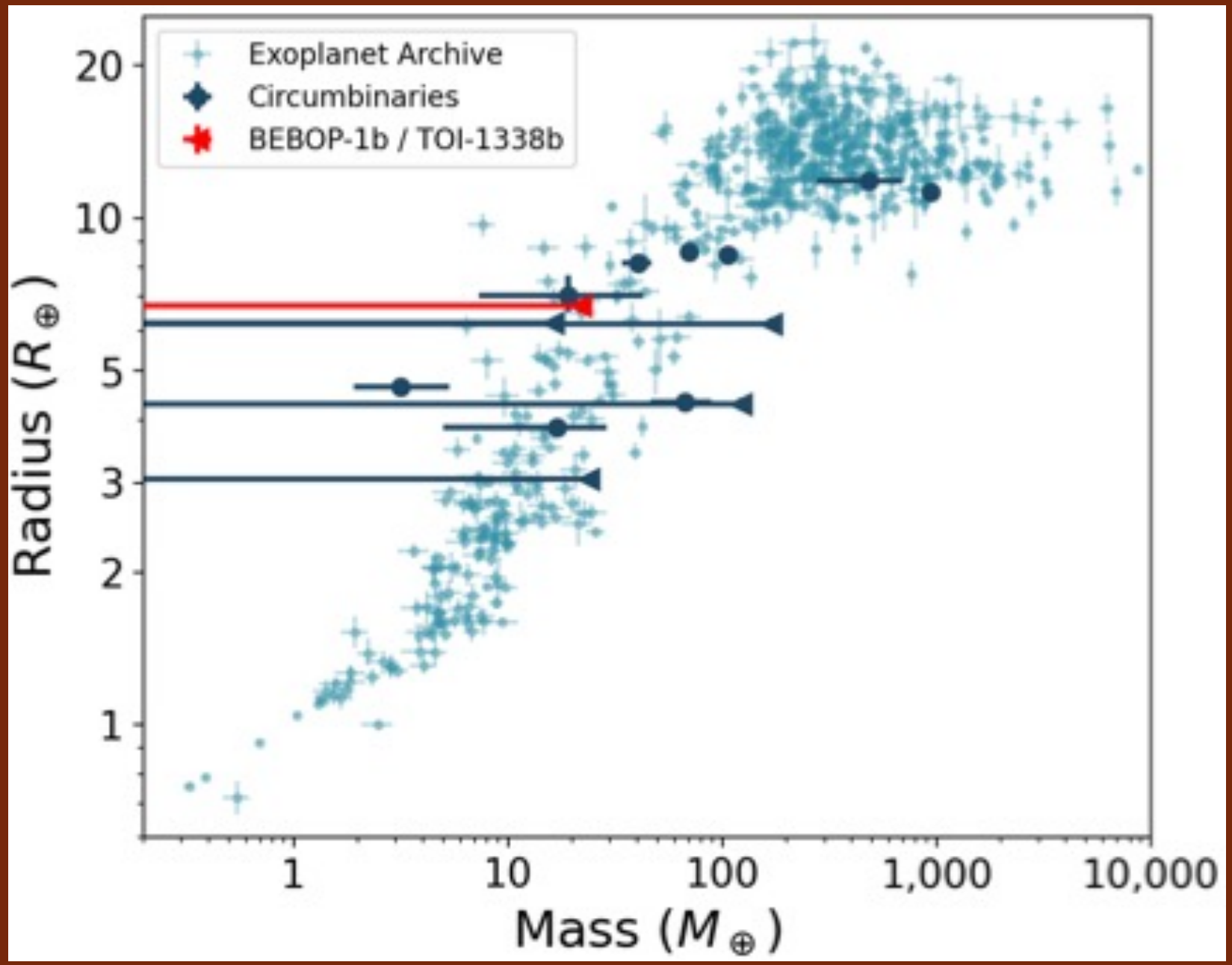
Martin & Triaud (2014)

Long stares **important** for detecting these transits

PLATO's long stares

BEBOP Survey

Binaries Escorted By Orbiting Planets

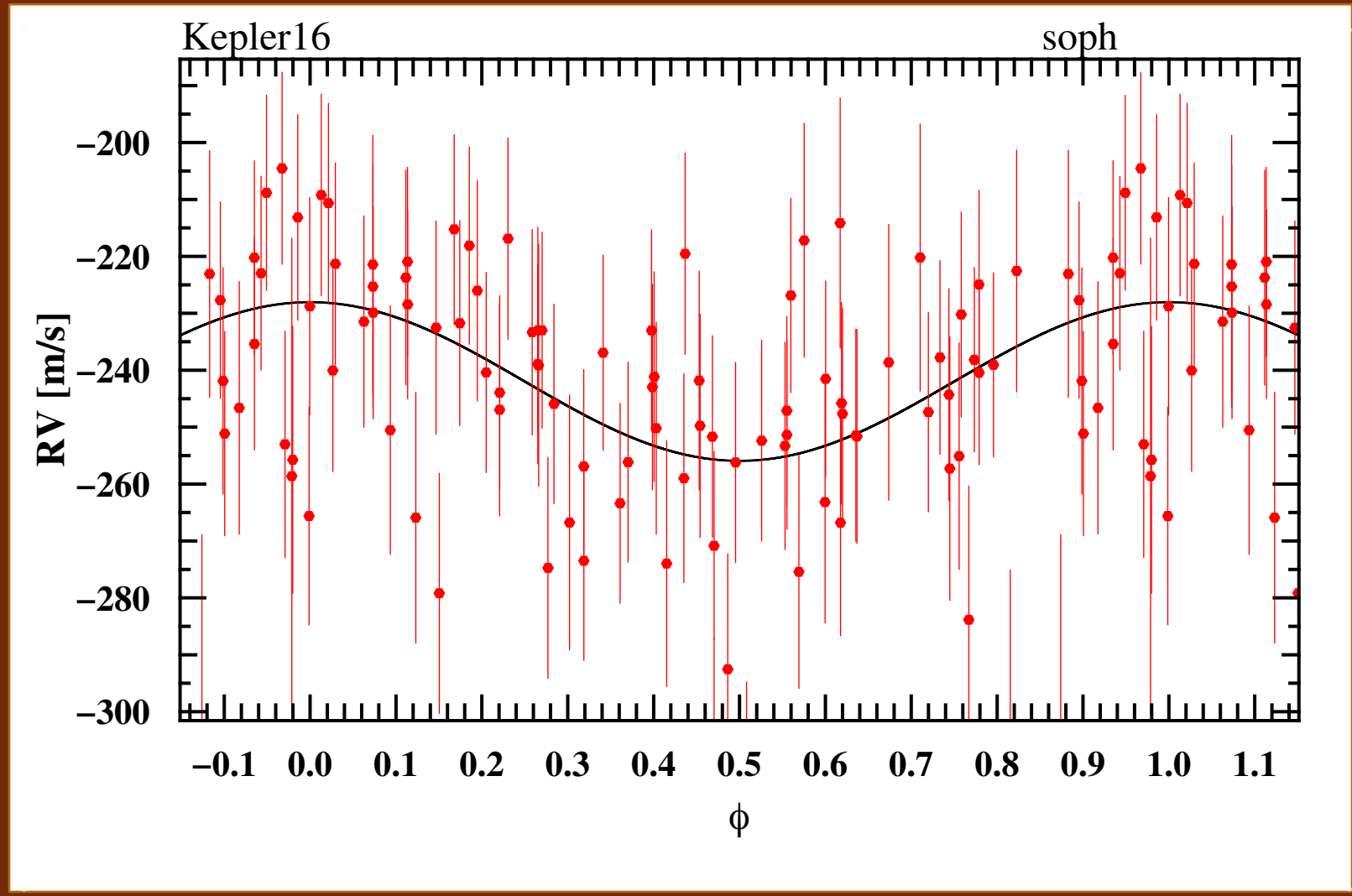


Standing et al. (2023)

Kepler-16b the first ever circumbinary RV detection

$M_{RV} = 0.313 \pm 0.039\ M_J$

$M_{ETV} = 0.333 \pm 0.016\ M_J$



Triaud, Standing et al. (2022)

The first ever circumbinary RV **discovery**
TOI-1338/BEBOP-1

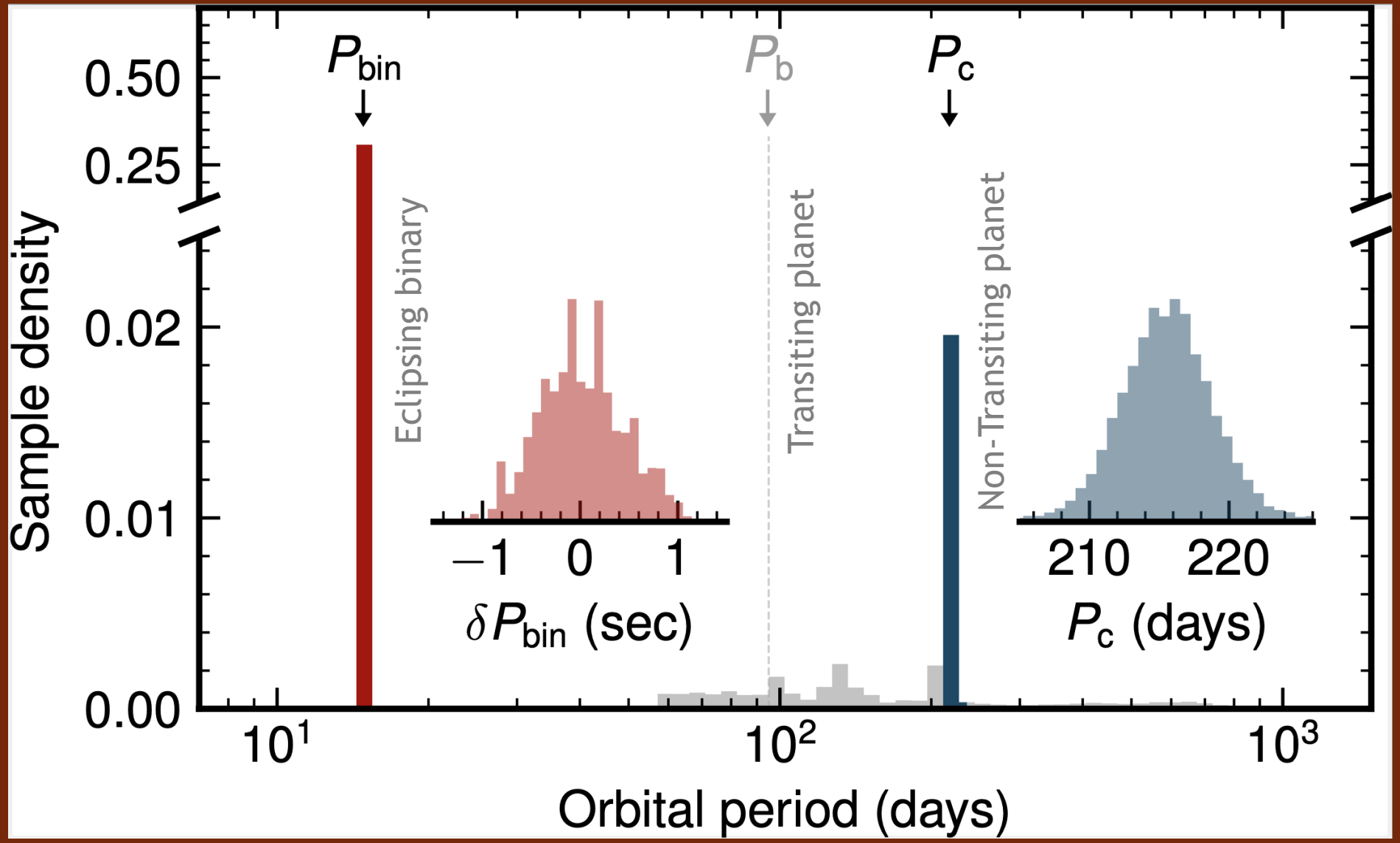
$M_c \sin(i) = 0.2\ M_J$

$P_c = 215.5$ d

$a_c = 0.8$ AU

$M_b \sin(i) < 21.8\ M_\oplus$

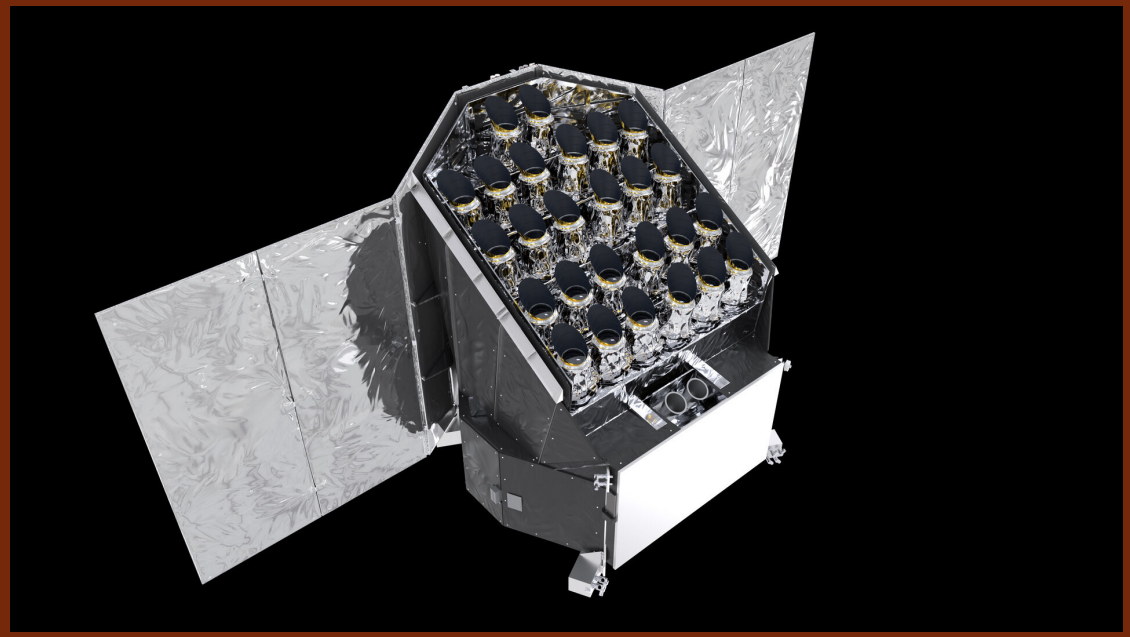
$\rho_b < 0.36$ g/cm^3



Standing et al. 2023

Conclusions & future work

- Circumbinary planets are interesting targets
- Expect PLATO to >double the number of Circumbinary planets
- BEBOP-1c first CBP discovery with RV's



Preparation for discovery of circumbinary planets with the PLATO mission

matthew.standing@esa.int

@StandingMatthew