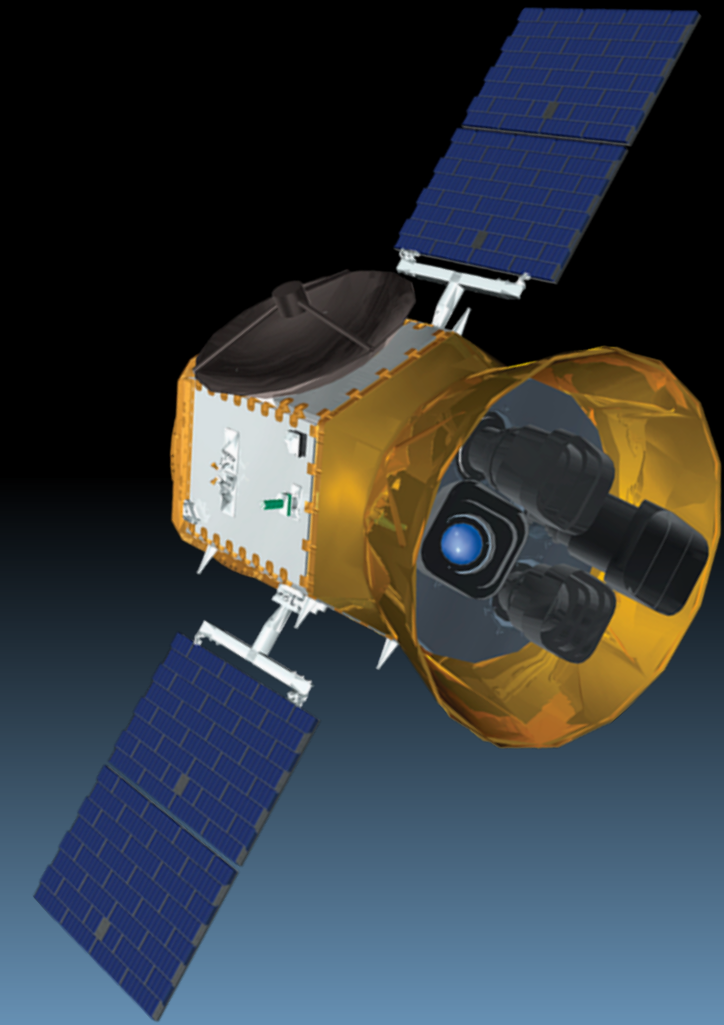
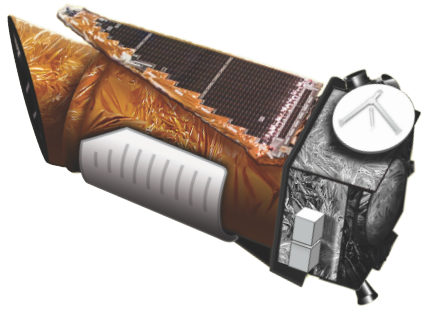


The Transiting Exoplanet Survey Satellite

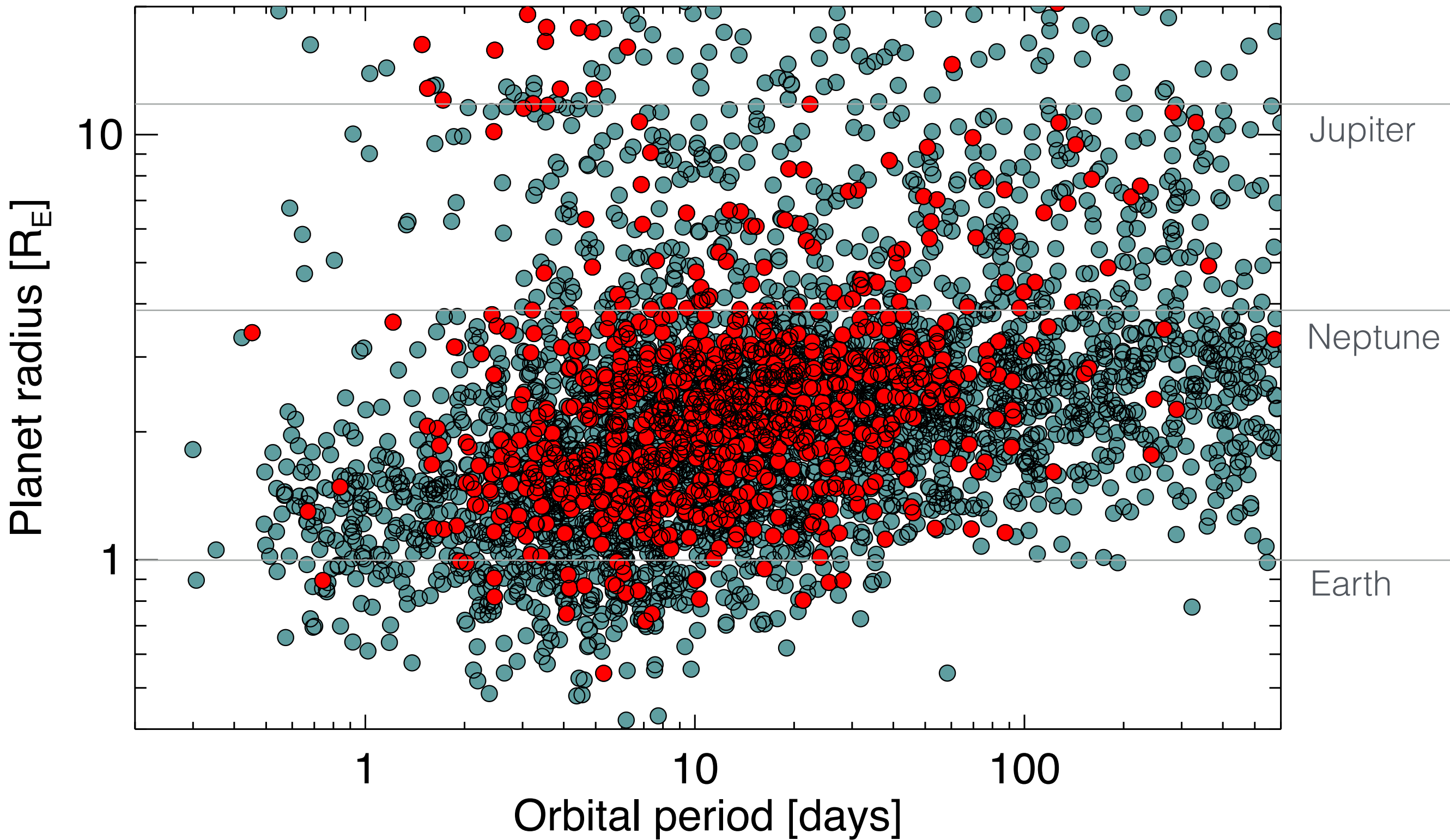
Josh Winn (MIT)

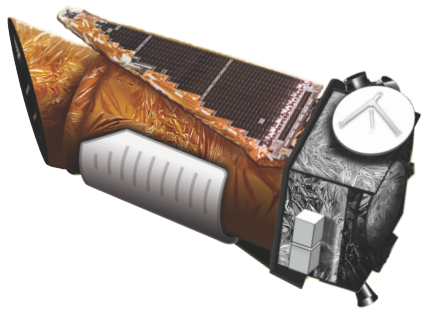




Kepler planets

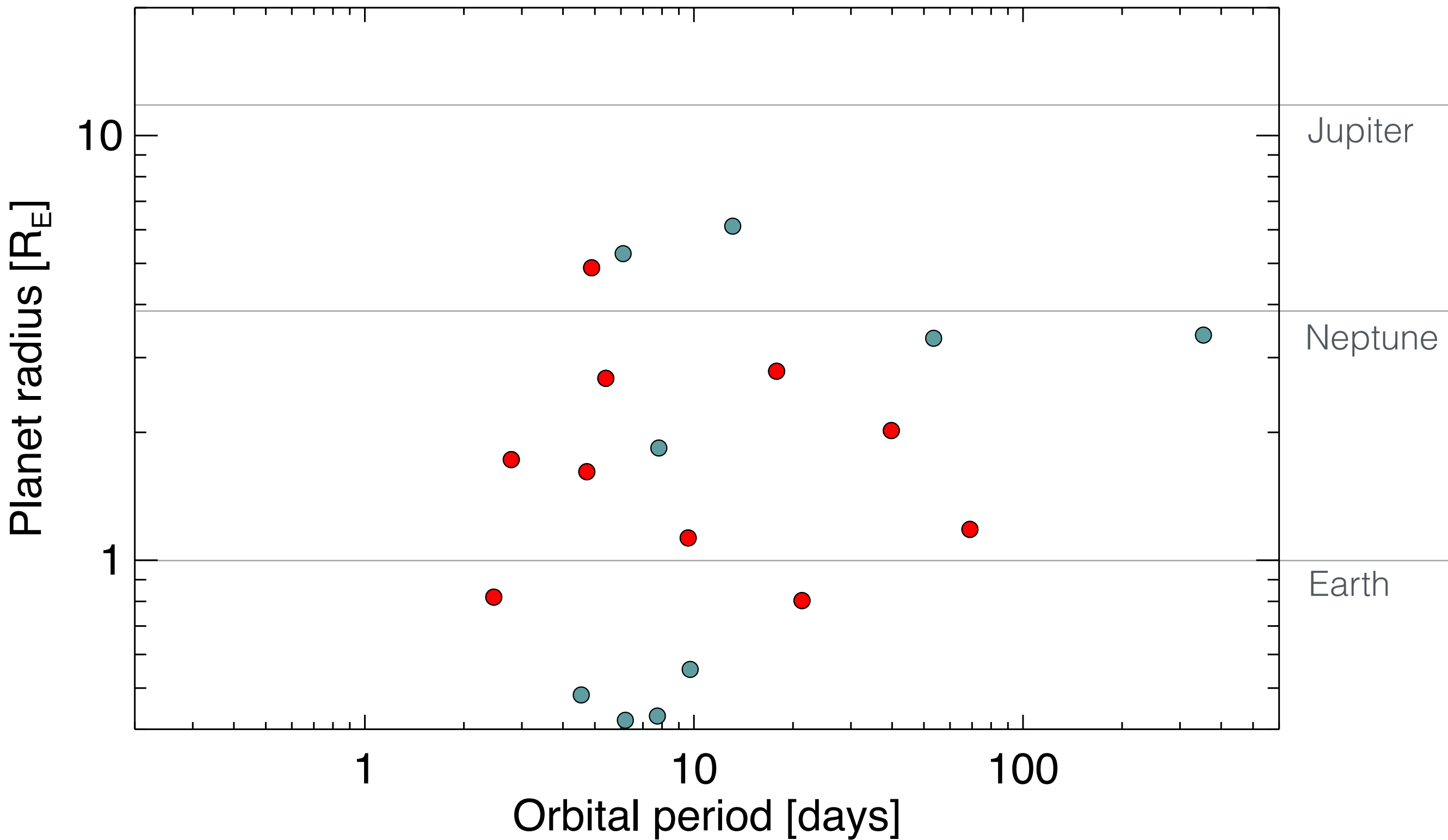
● candidate ● confirmed

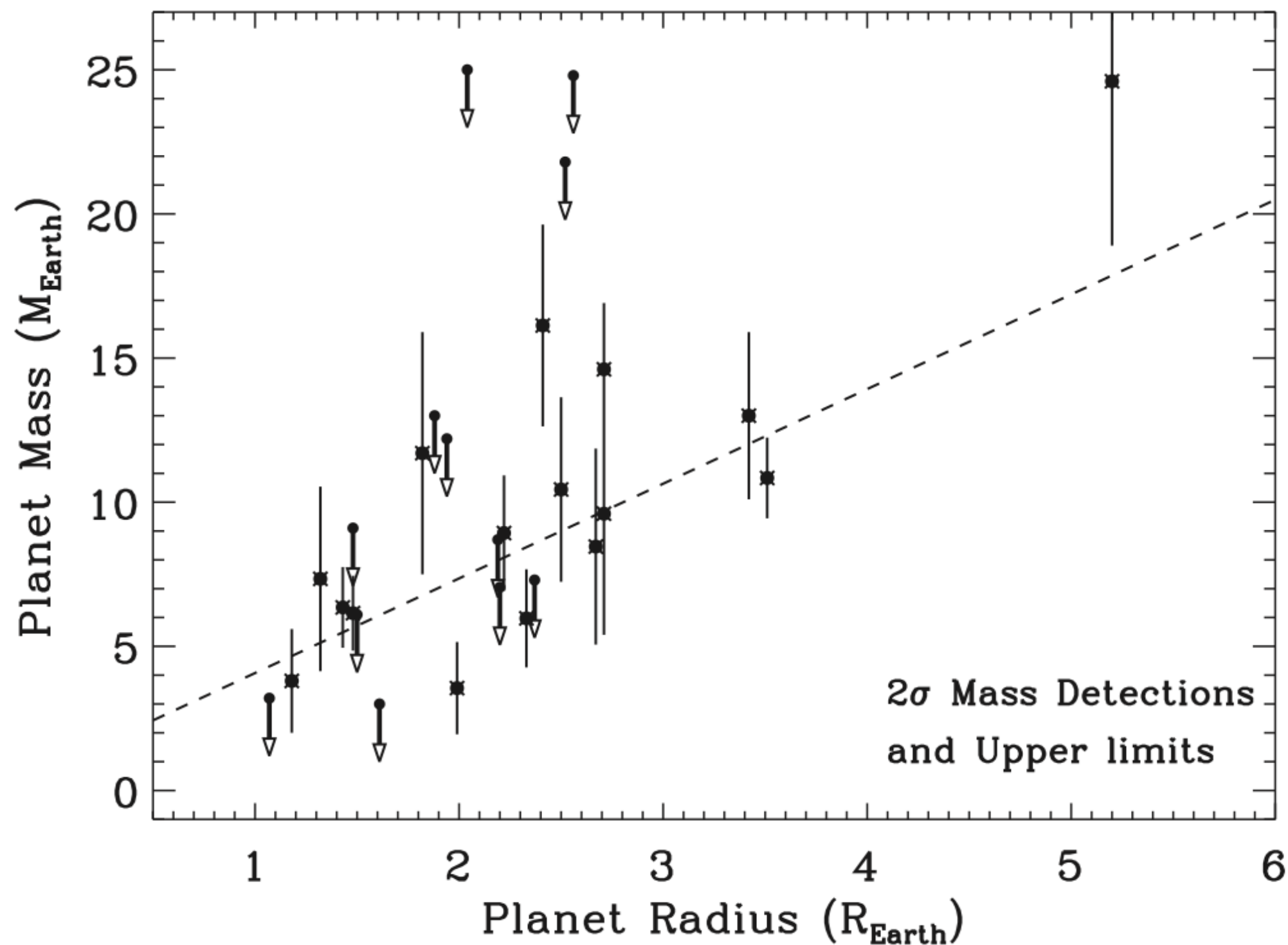


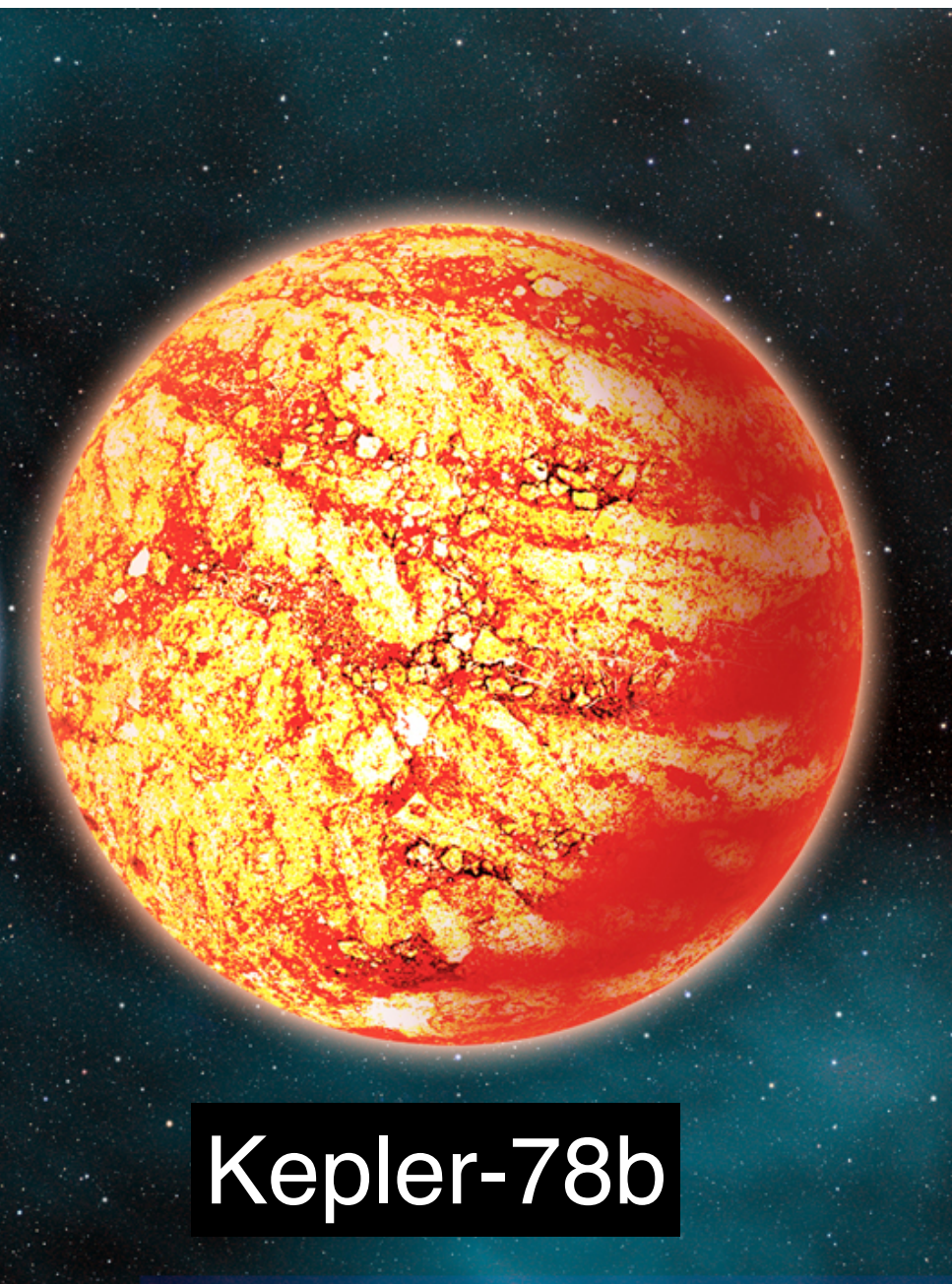


Kepler planets, $m_{\text{Kep}} < 10$

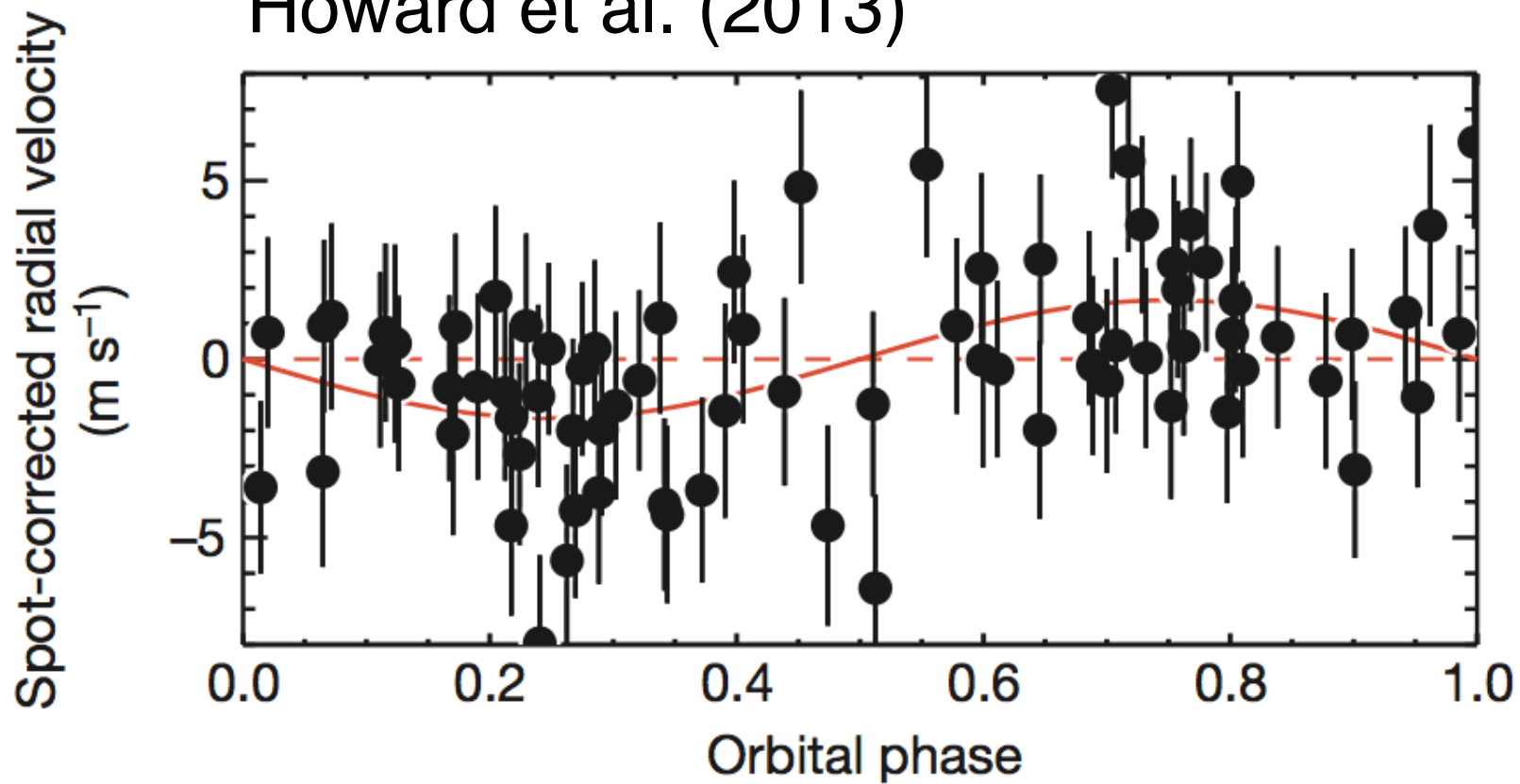
● candidate ● confirmed



MASSES, RADII, AND ORBITS OF SMALL *KEPLER* PLANETS:
THE TRANSITION FROM GASEOUS TO ROCKY PLANETS*GEOFFREY W. MARCY¹, HOWARD ISAACSON¹, ANDREW W. HOWARD², JASON F. ROWE³, JON M. JENKINS⁴, STEPHEN T. BRYSON³, ...

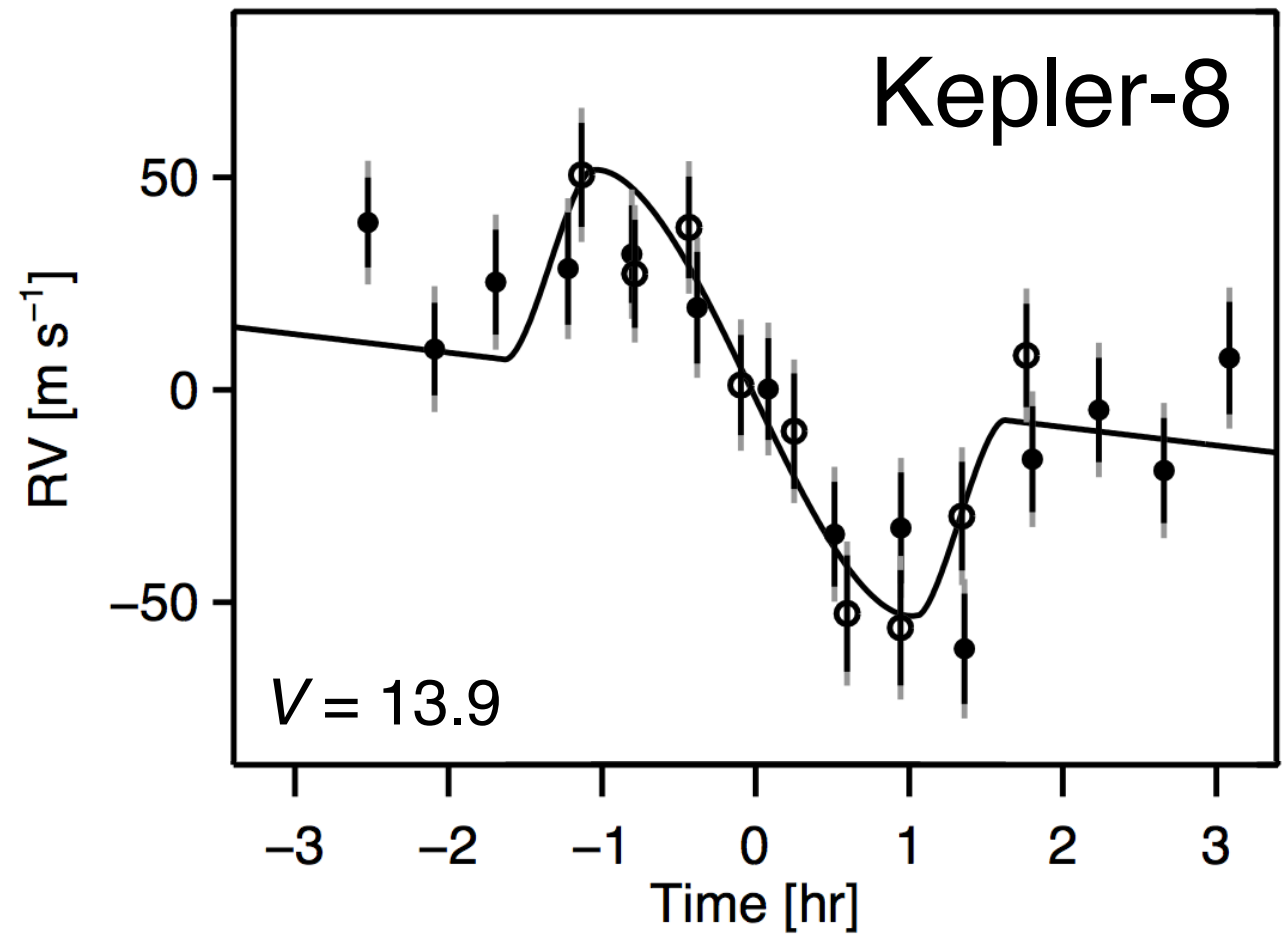
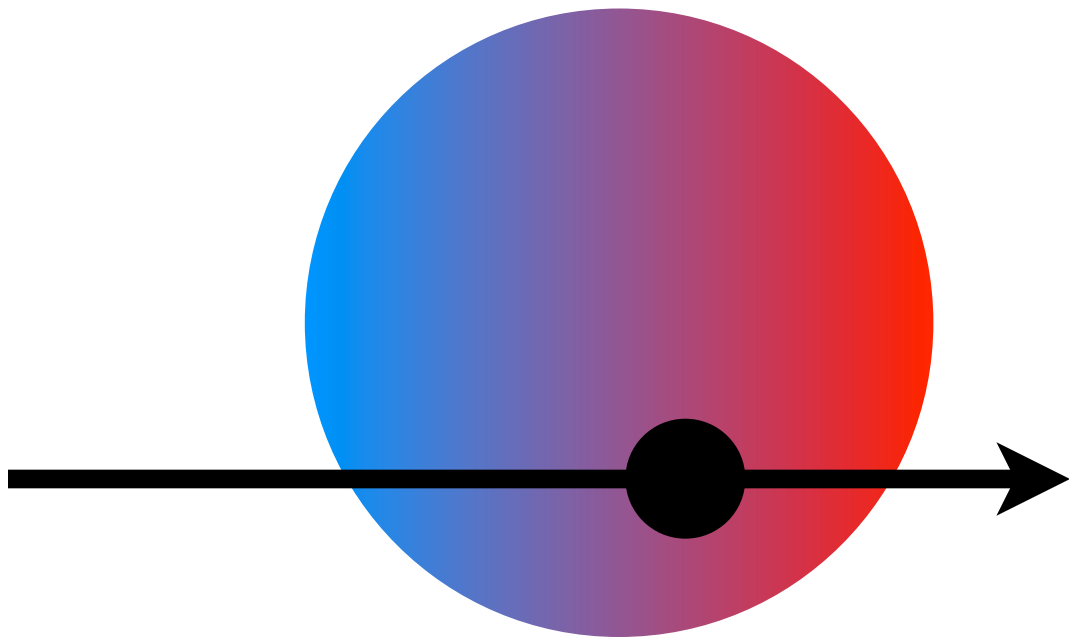


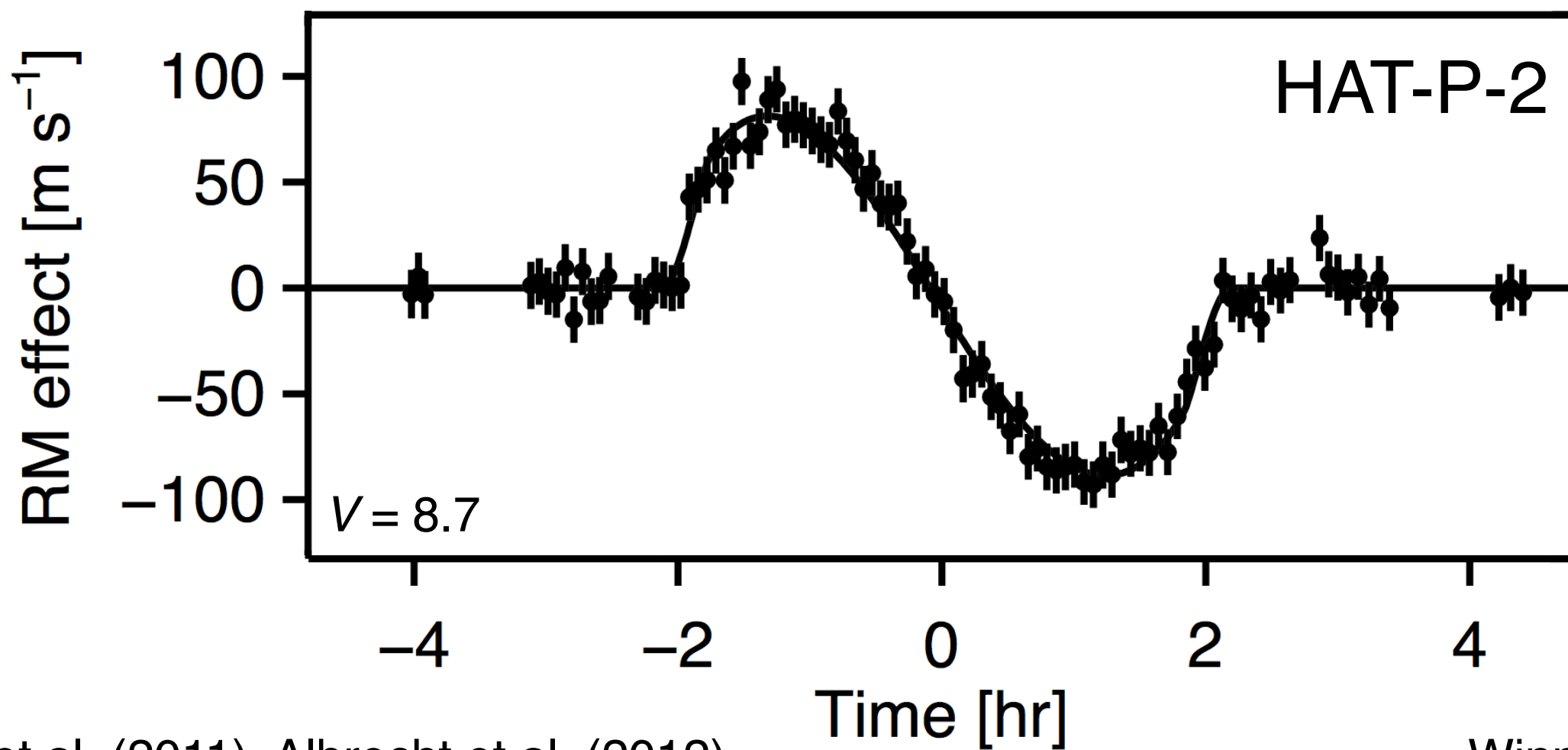
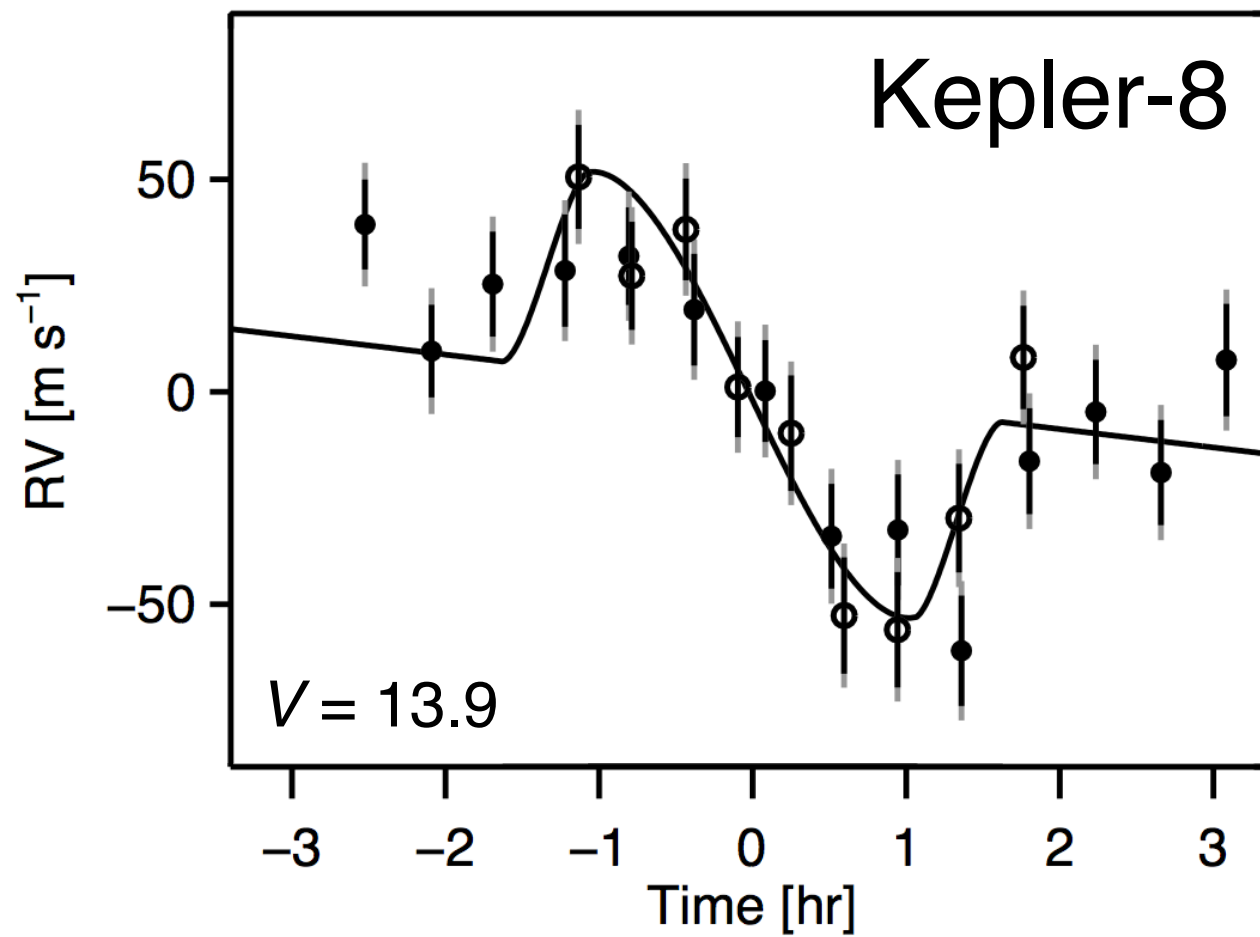
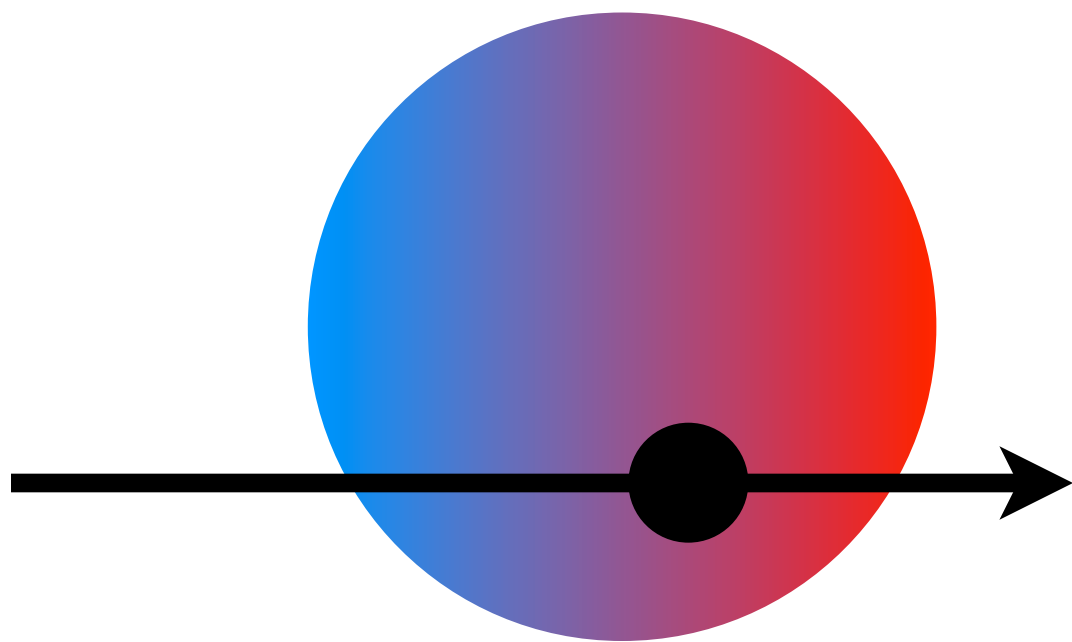
Howard et al. (2013)



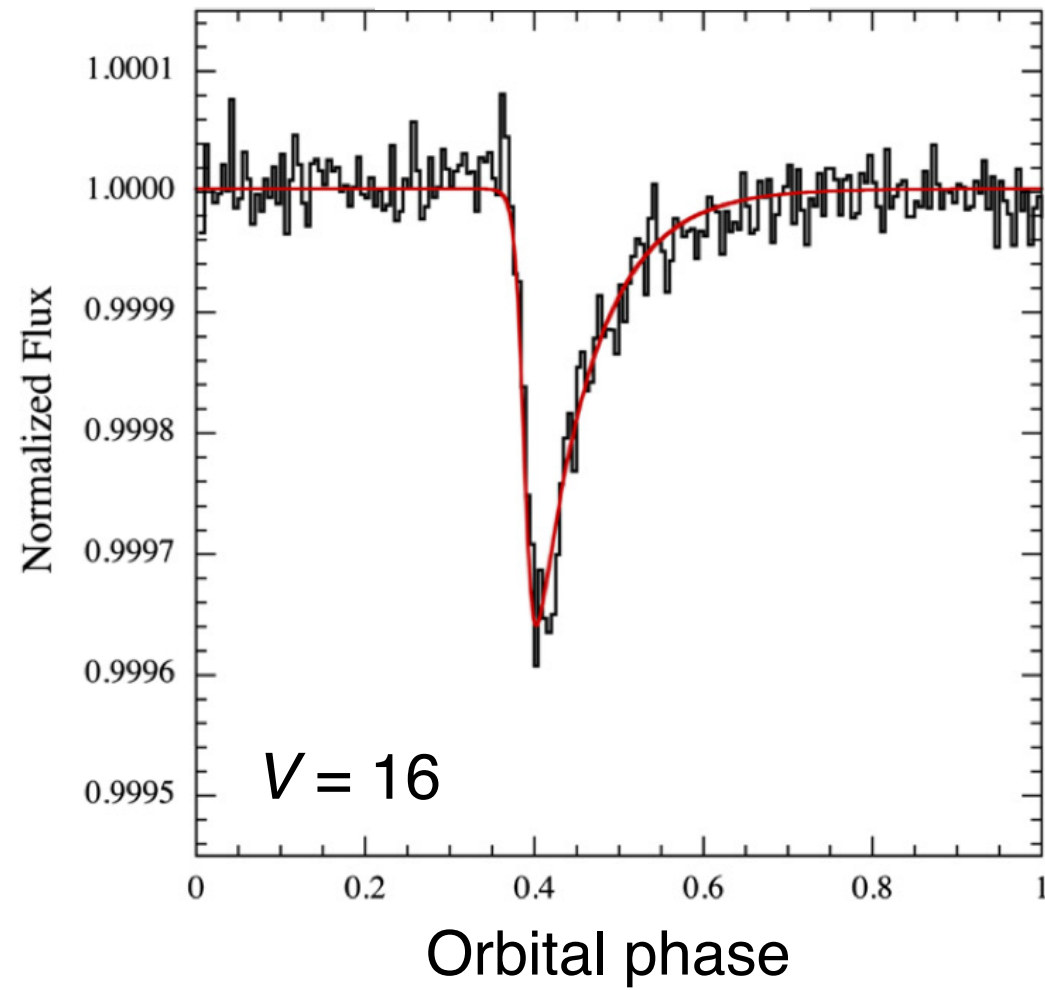
Pepe et al. (2013)



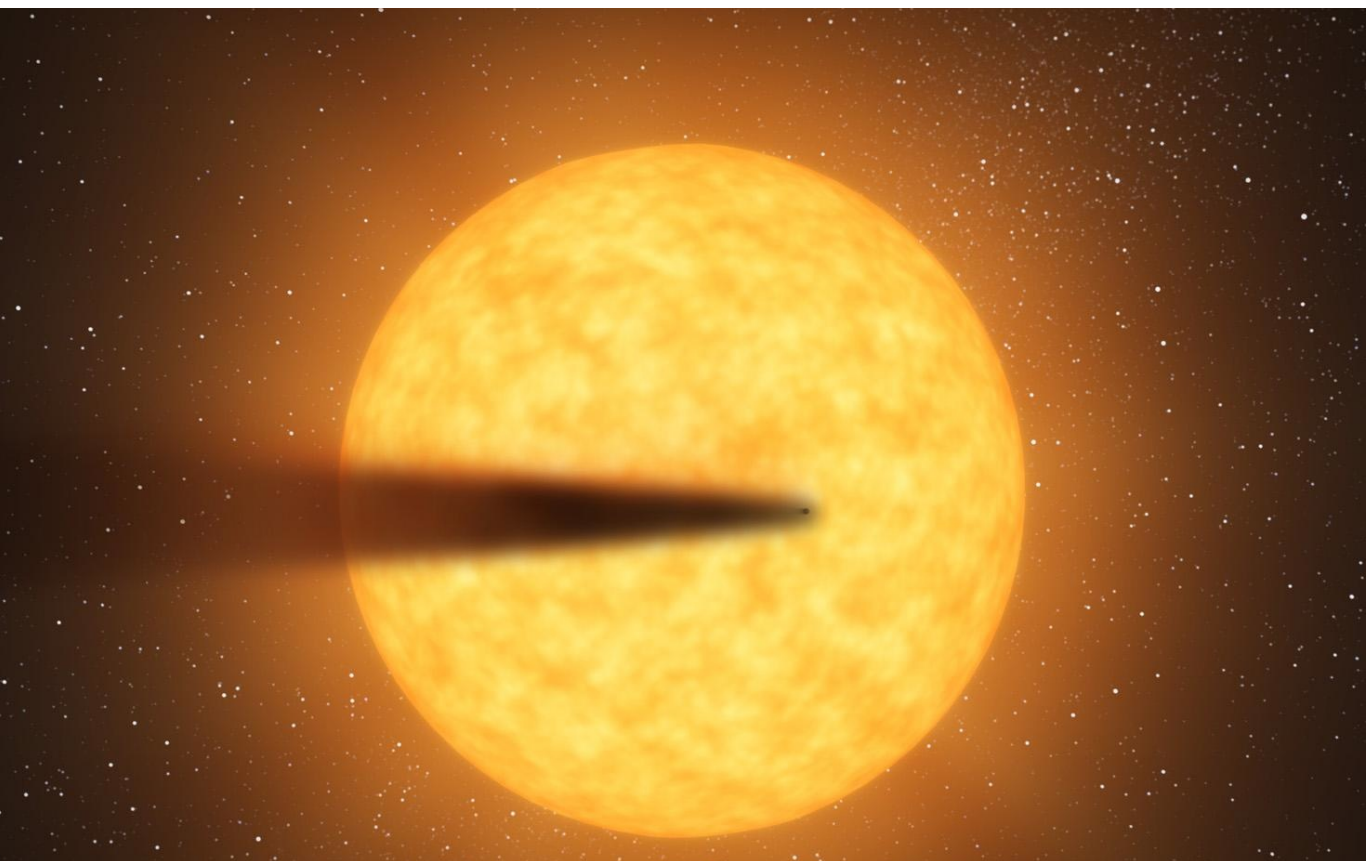
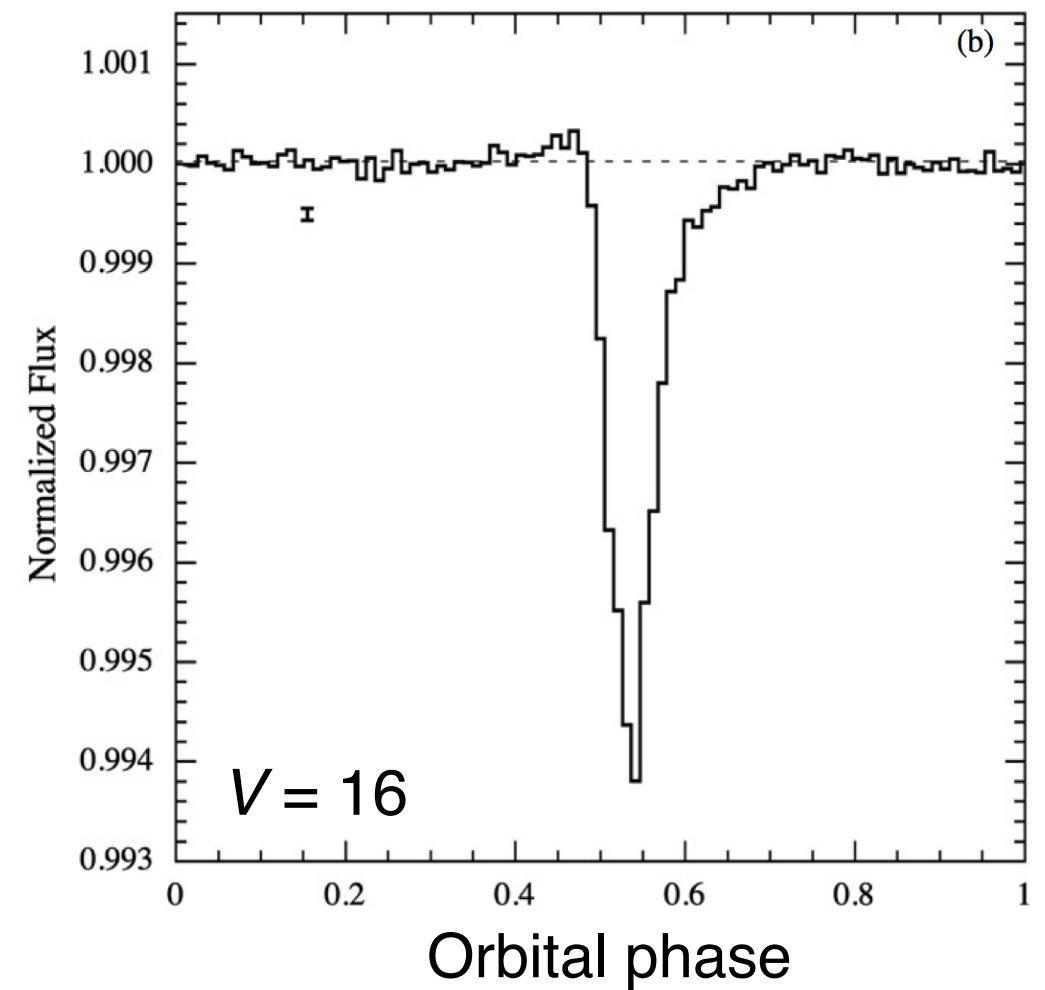




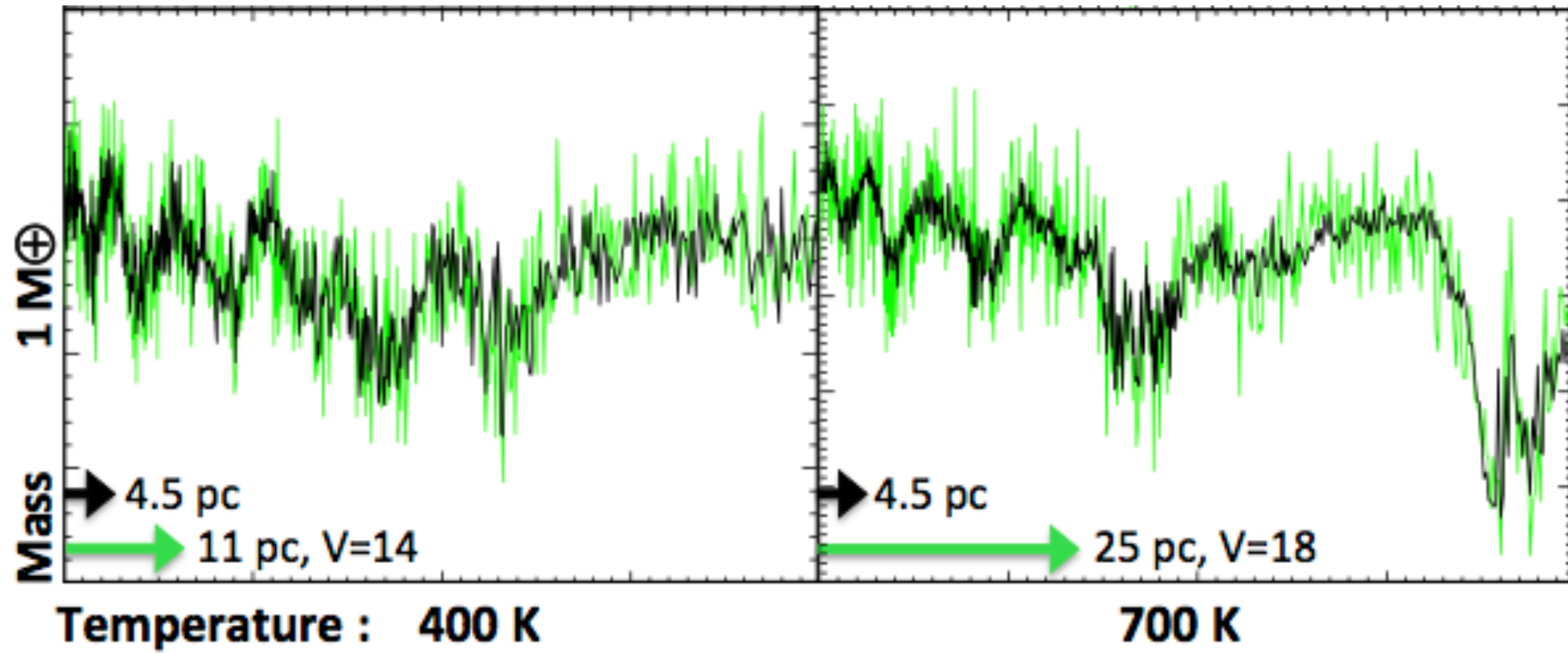
KOI-2700



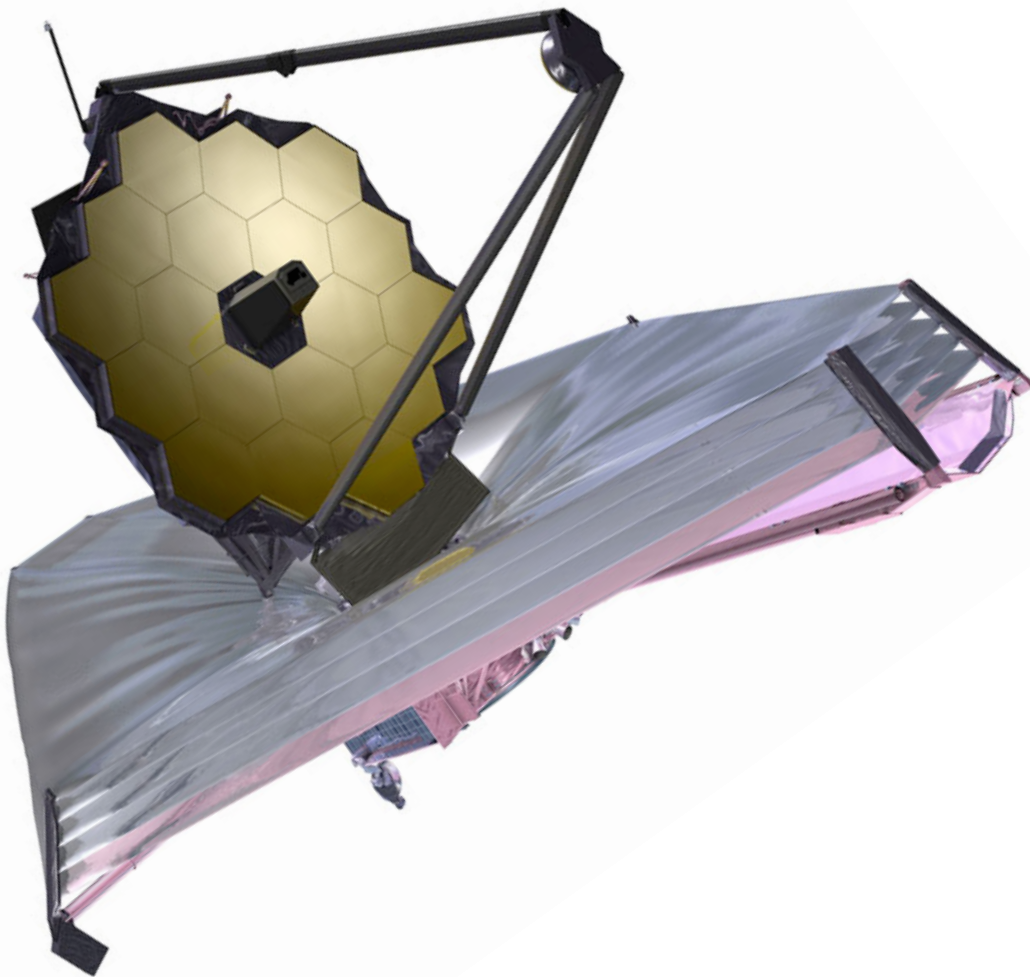
KIC 12557548

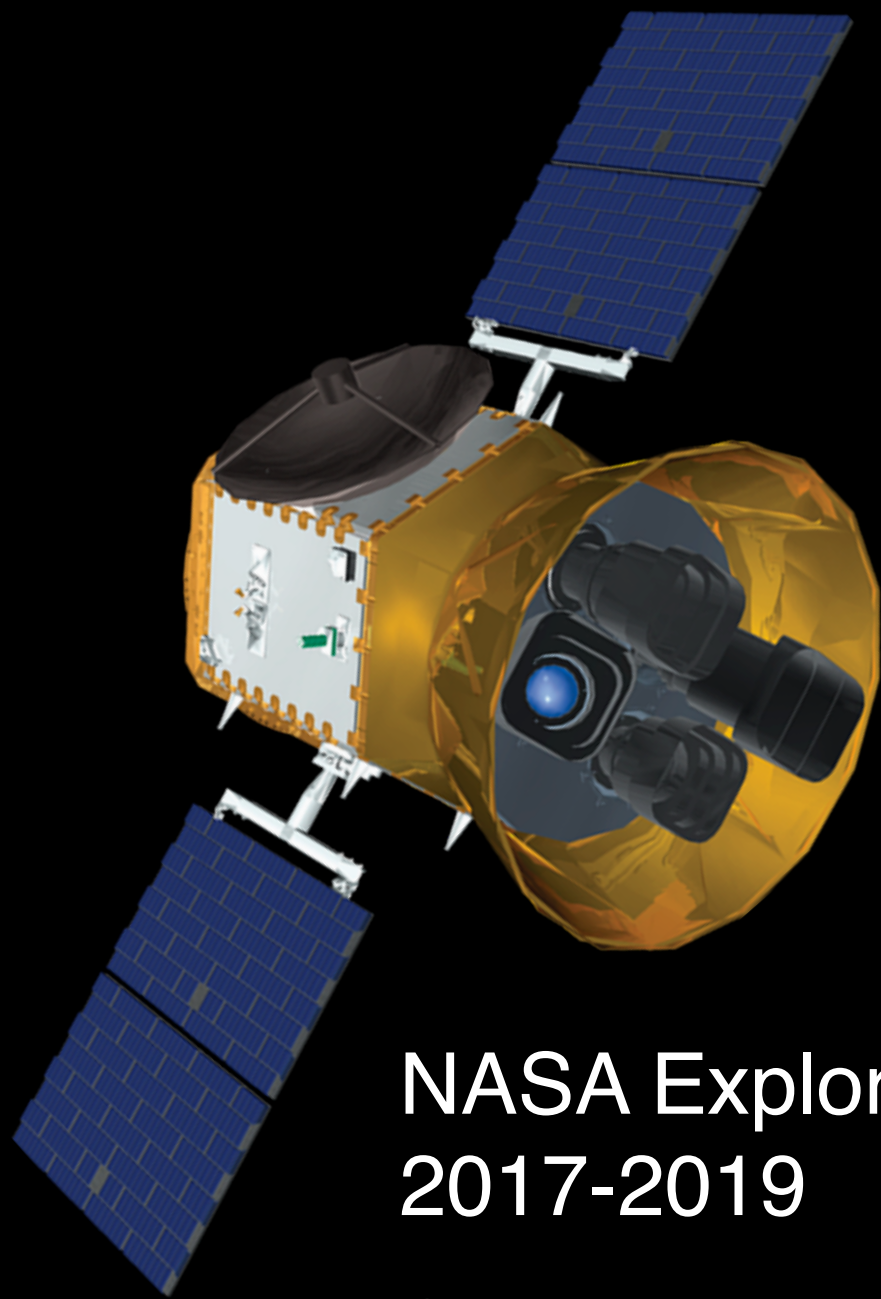


Disintegrating rocky planets?



simulated JWST/NIRSpec data
Batalha et al. (2013)





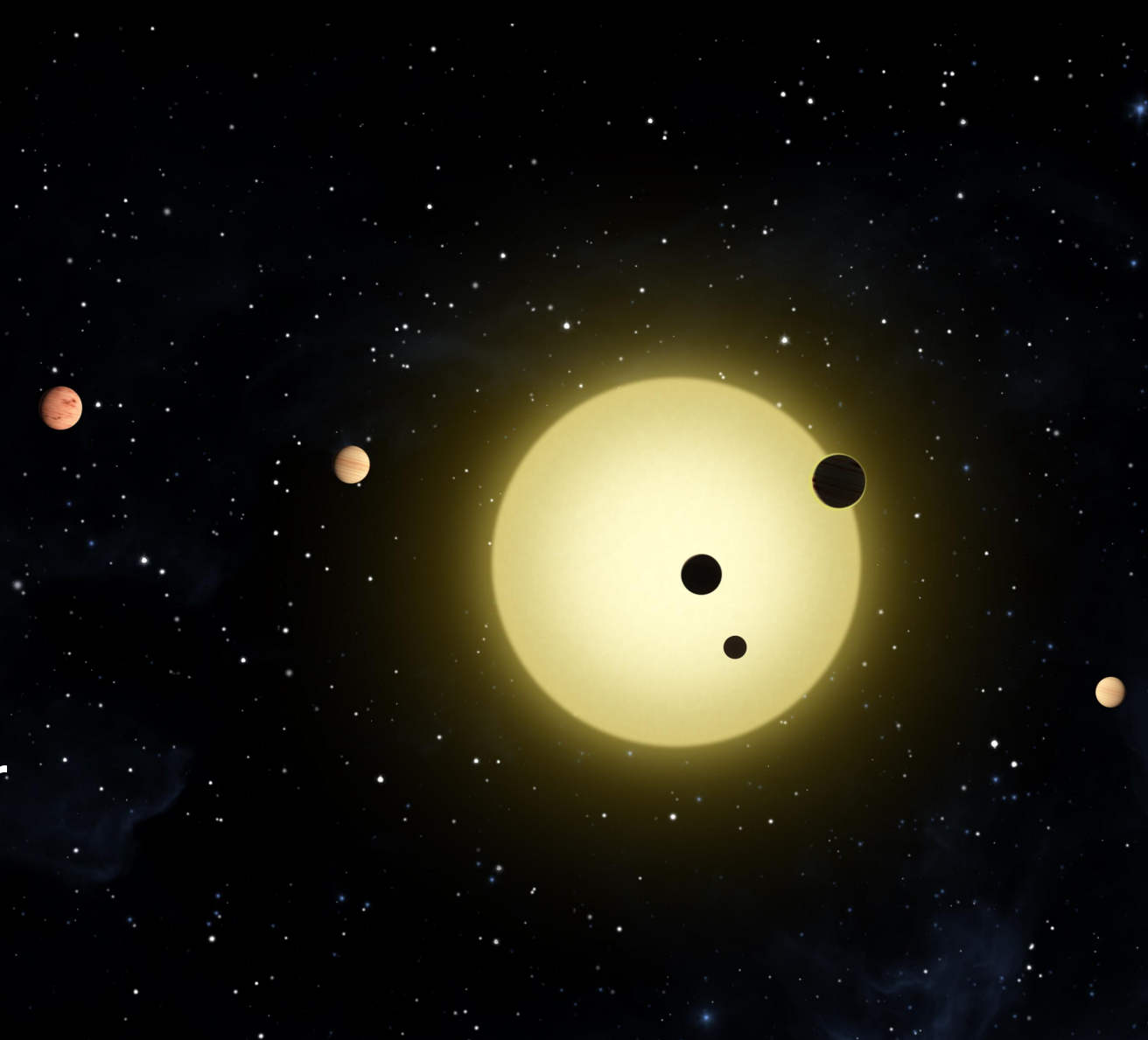
TESS

Transiting Exoplanet Survey Satellite

NASA Explorer mission,
2017-2019

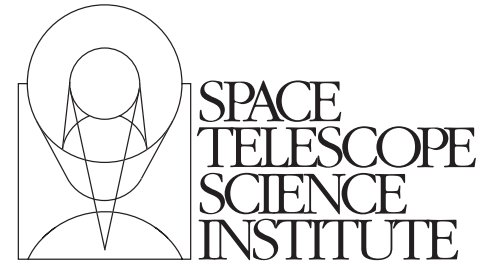
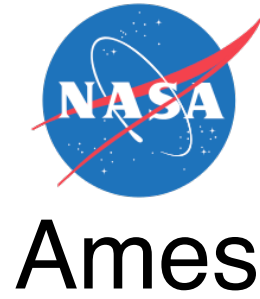
Search 200,000+ stars,
 $I = 4-13$, 90% of the sky

Discover hundreds of
transiting planets smaller
than Neptune





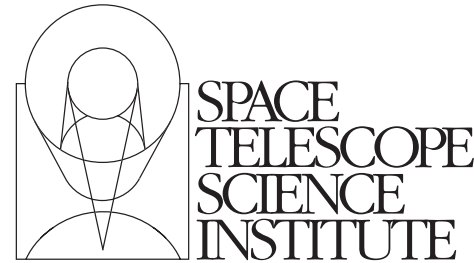
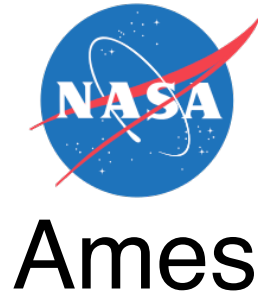
George Ricker (P.I.)



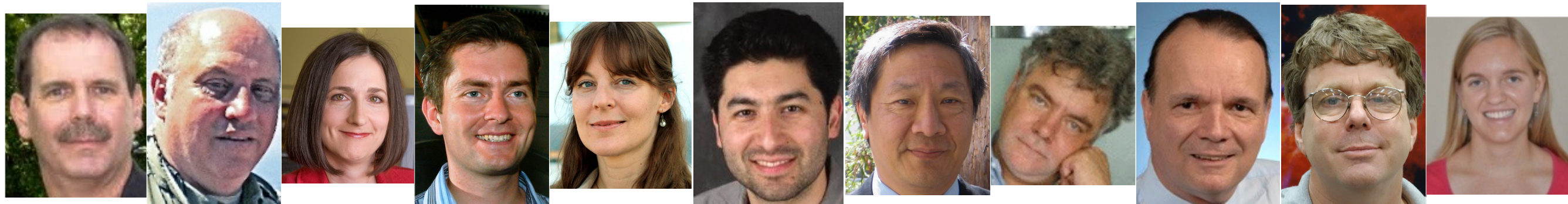
Roland Vanderspek (Deputy P.I.)

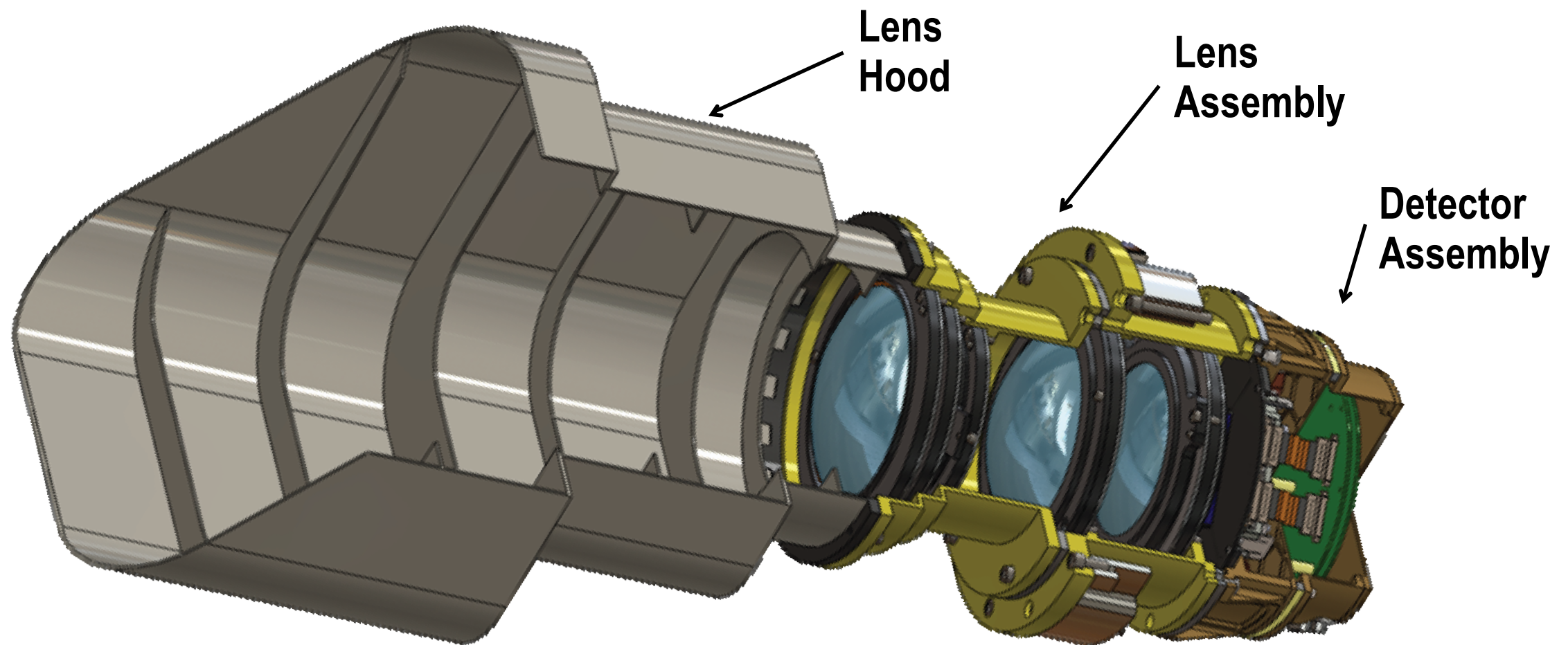


George Ricker (P.I.)

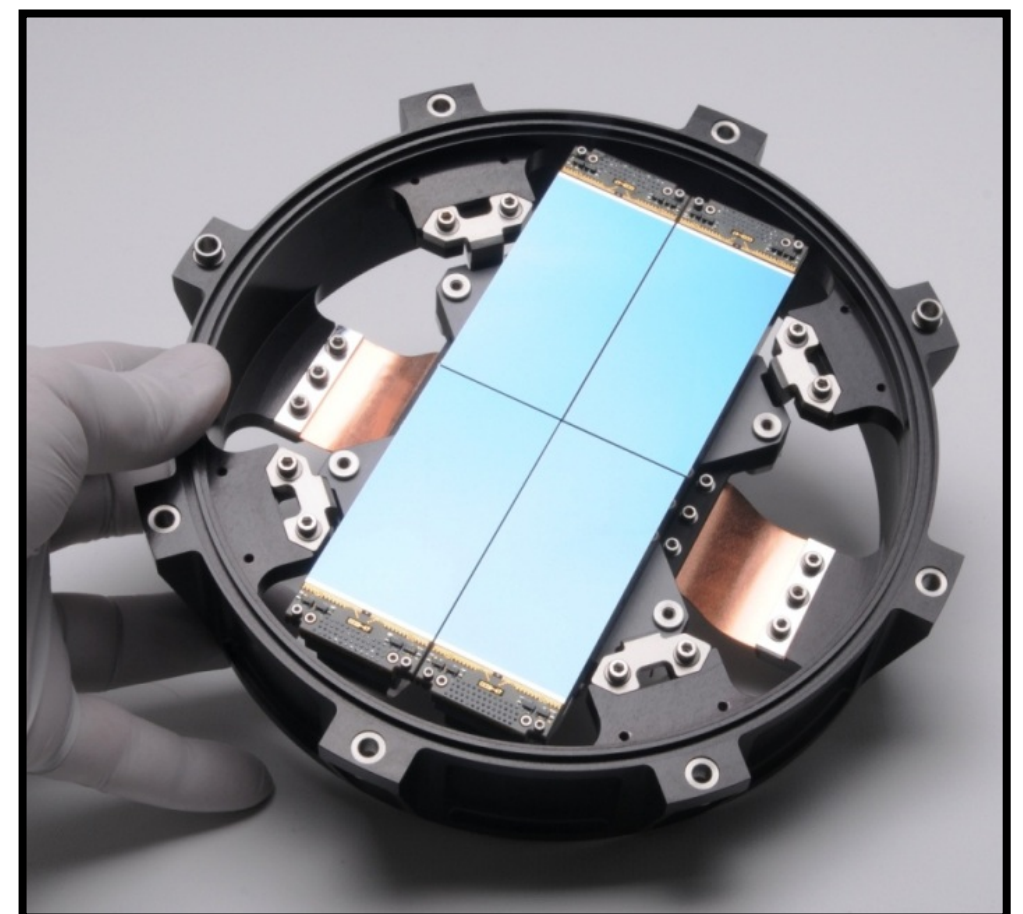


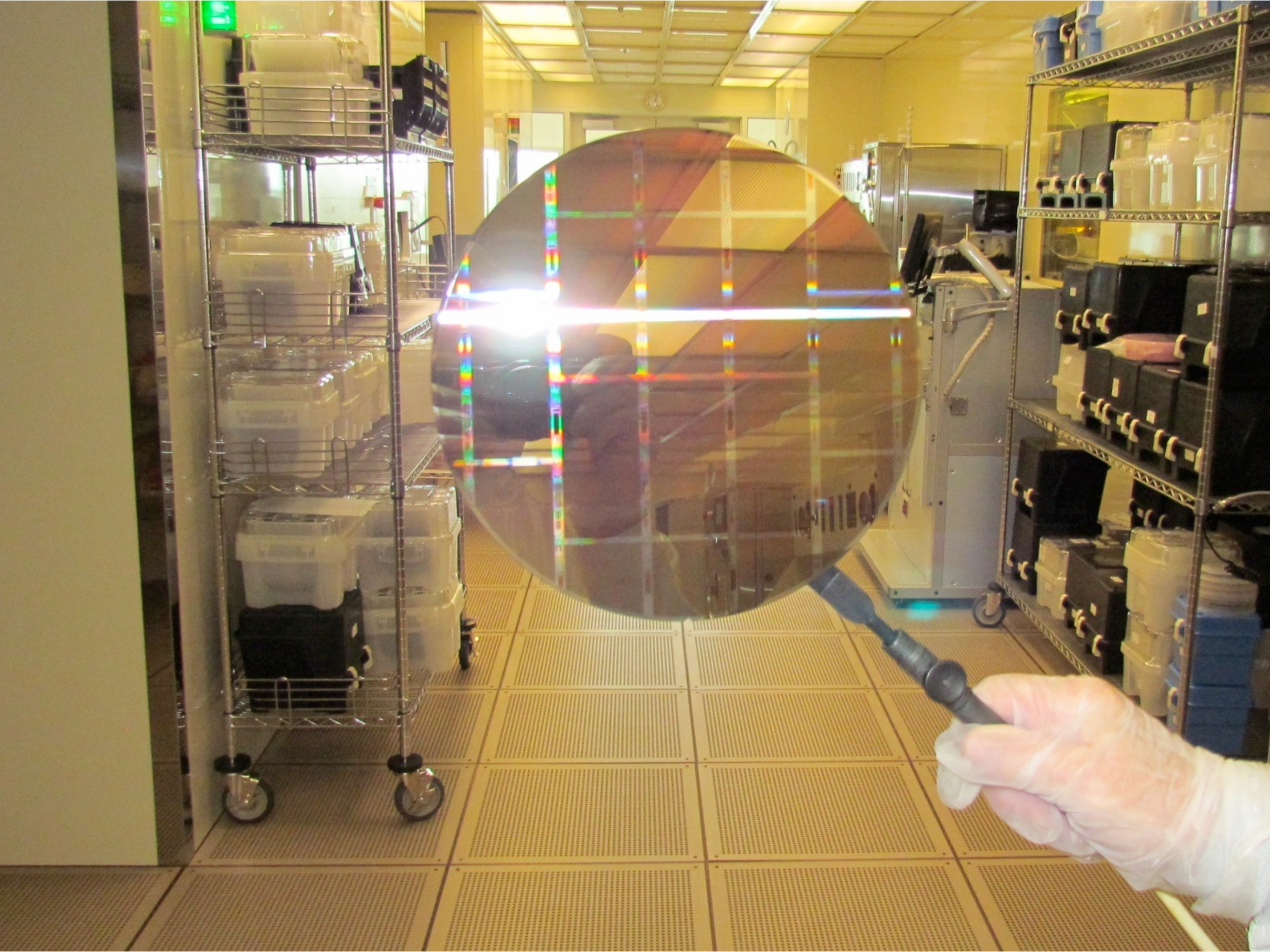
Roland Vanderspek (Deputy P.I.)





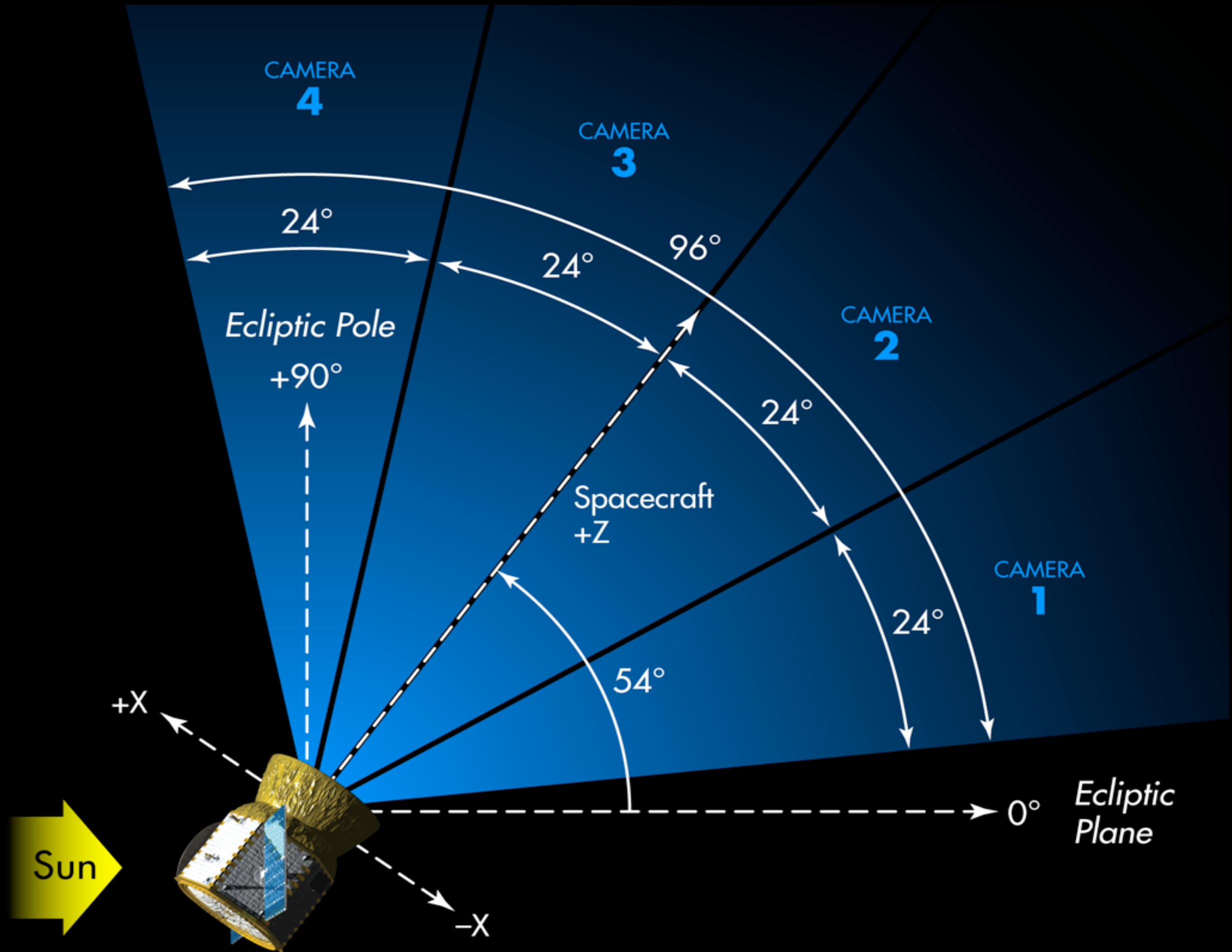
Entrance pupil diameter	10.5 cm
Bandpass	600-1000 nm
Field of view	24° x 24°
Cadence for target stars	2 min
Cadence for full frame images	30 min

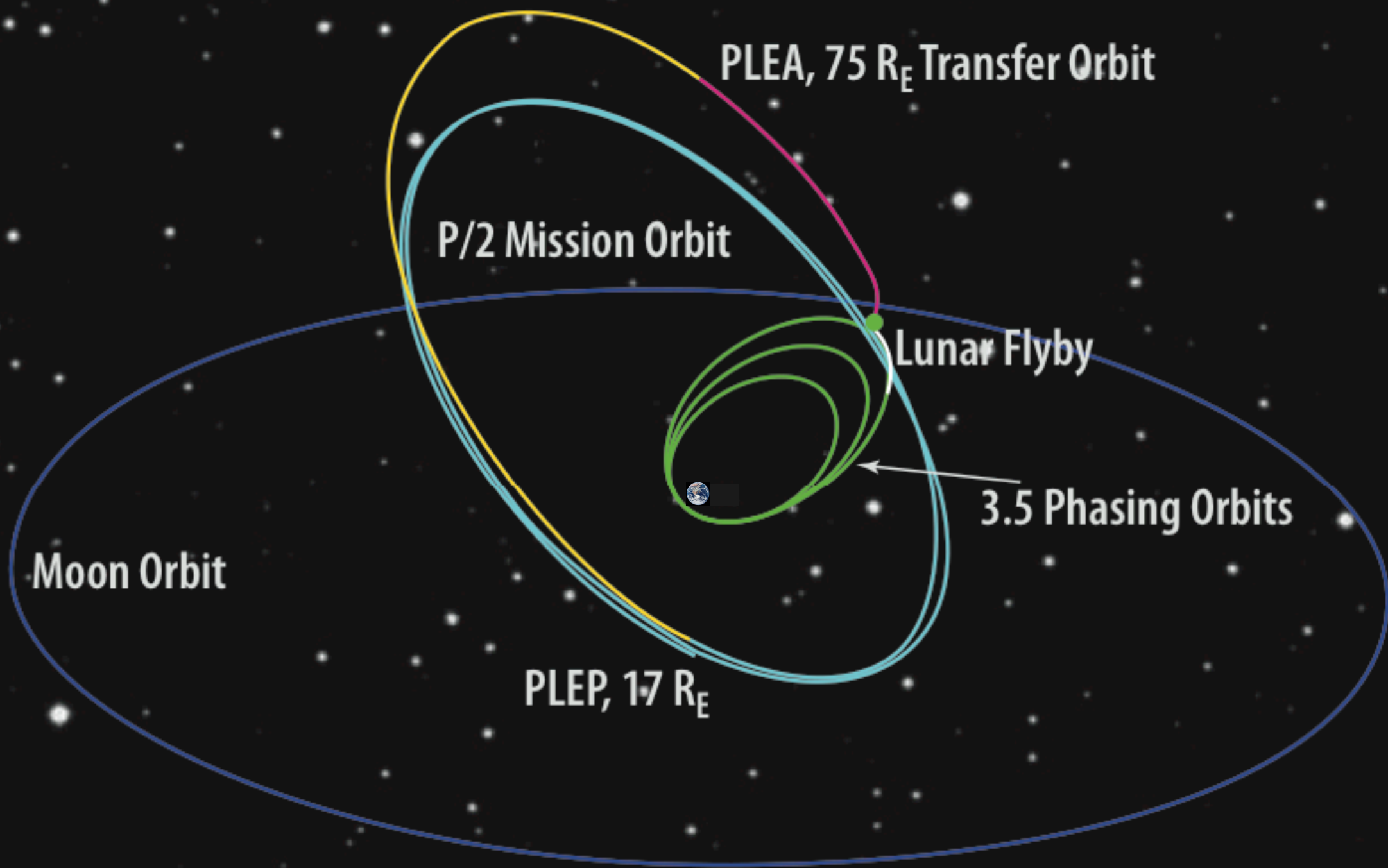












PLEA, 75 R_E Transfer Orbit

P/2 Mission Orbit

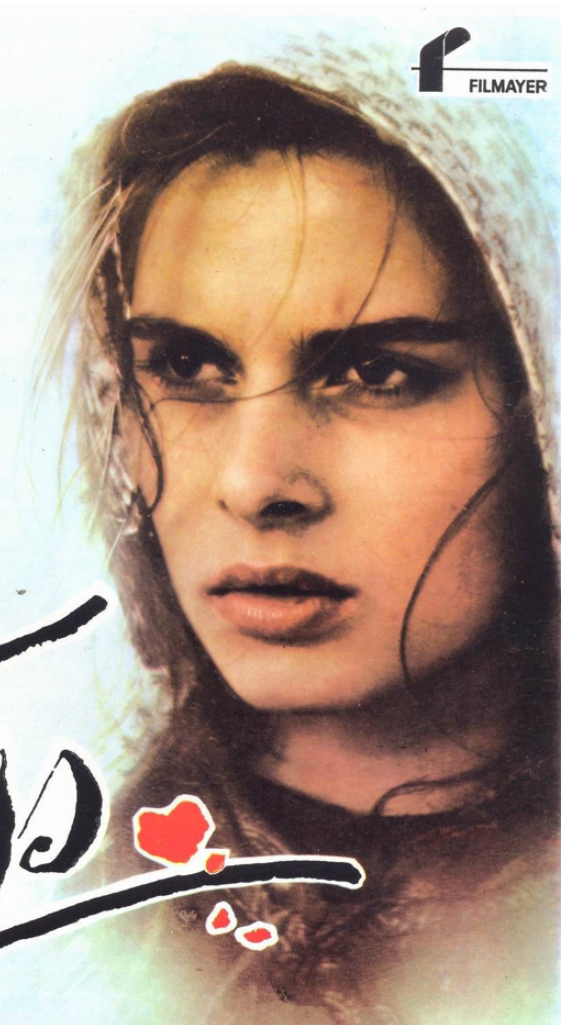
Lunar Flyby

3.5 Phasing Orbits

Moon Orbit

PLEP, 17 R_E

RENN PRODUCTIONS
PARIS.
BURRILL PRODUCTIONS
LONDRES.



NASTASSIA
KINSKI
en

Tess

Un film de
ROMAN POLANSKI

NASTASSIA KINSKI · PETER FIRTH · LEIGH LAWSON

GUIÓN DE GERARD BRACH · ROMAN POLANSKI · JOHN BROWNJOHN SEGUN LA NOVELA DE THOMAS HARDY 'TESS D'URBERVILLE'
MUSICA PHILIPPE SARDE FOTOGRAFIA GEOFFREY UNSWORTH · B.S.C., GHISLAIN CLOQUET · ASC
DECORADOS PIERRE GUFFROY VESTUARIO ANTHONY POWELL PRODUCTOR EJECUTIVO PIERRE GRUNSTEIN
COPRODUCTOR TIMOTHY BURRILL PRODUCTOR ASOCIADO JEAN · PIERRE RASSAM DIRECTOR PRODUCCION PAUL MAIGRET
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Transiting Exoplanet Survey Satellite (TESS)



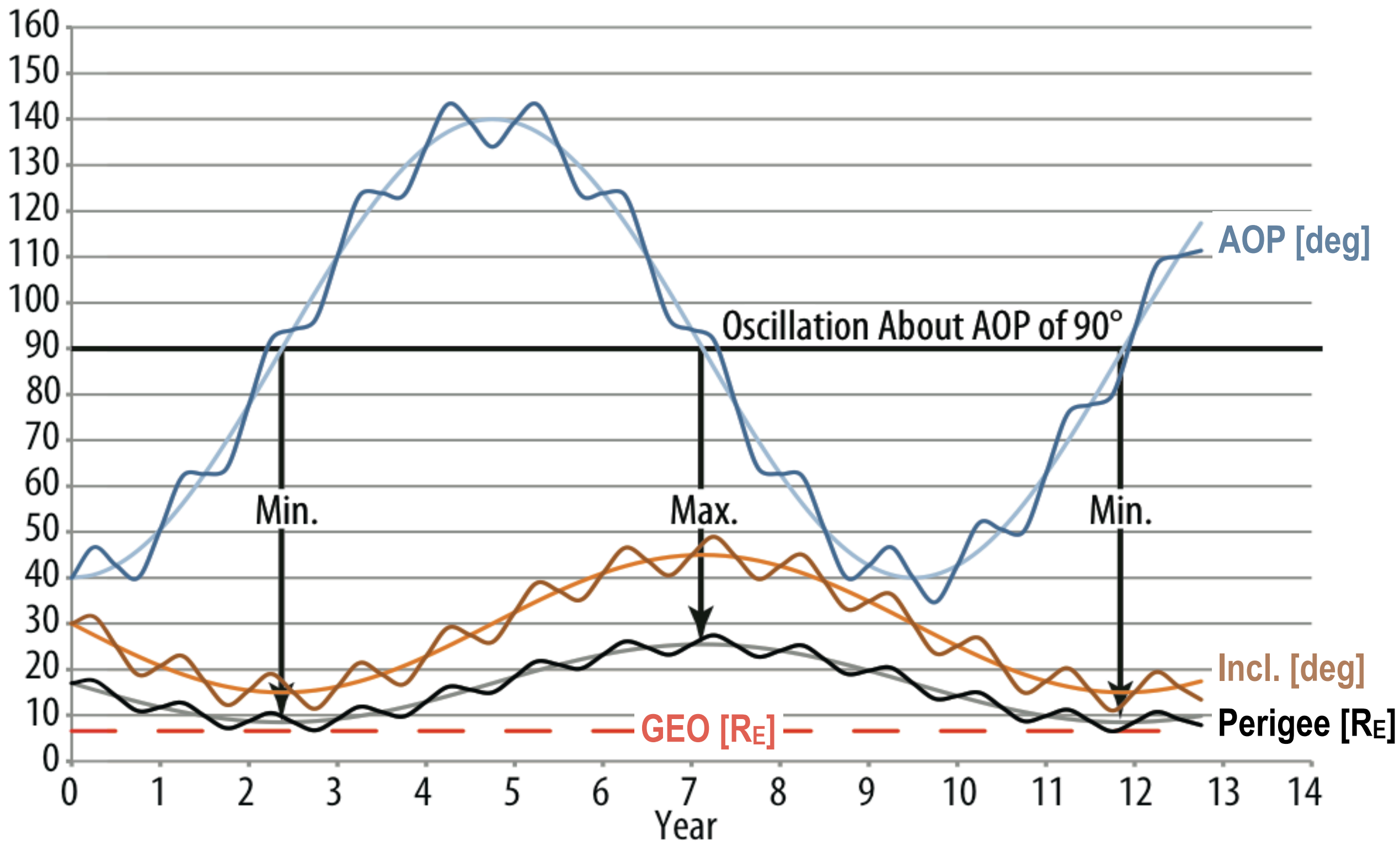
George Ricker

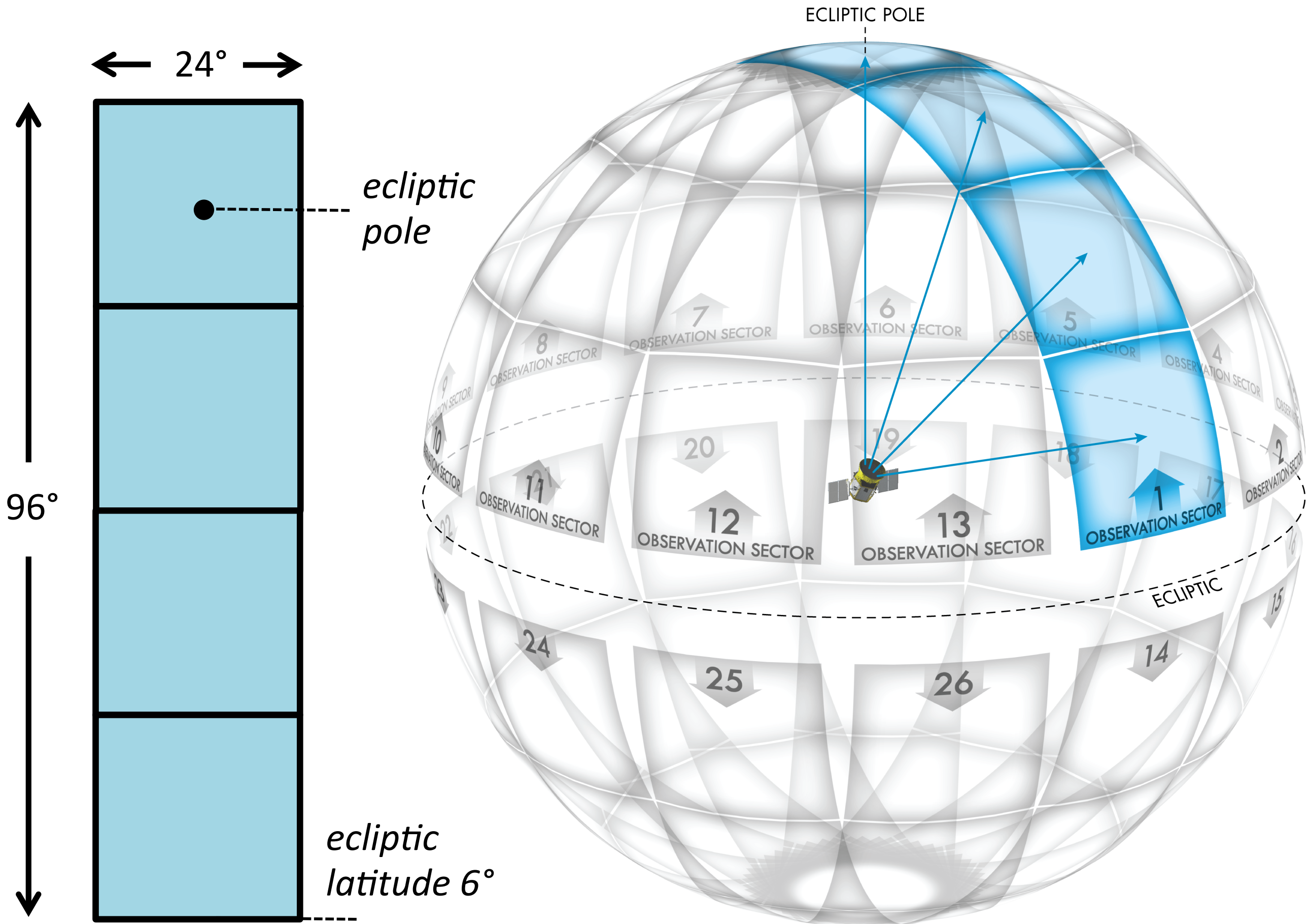
Subscribe 20

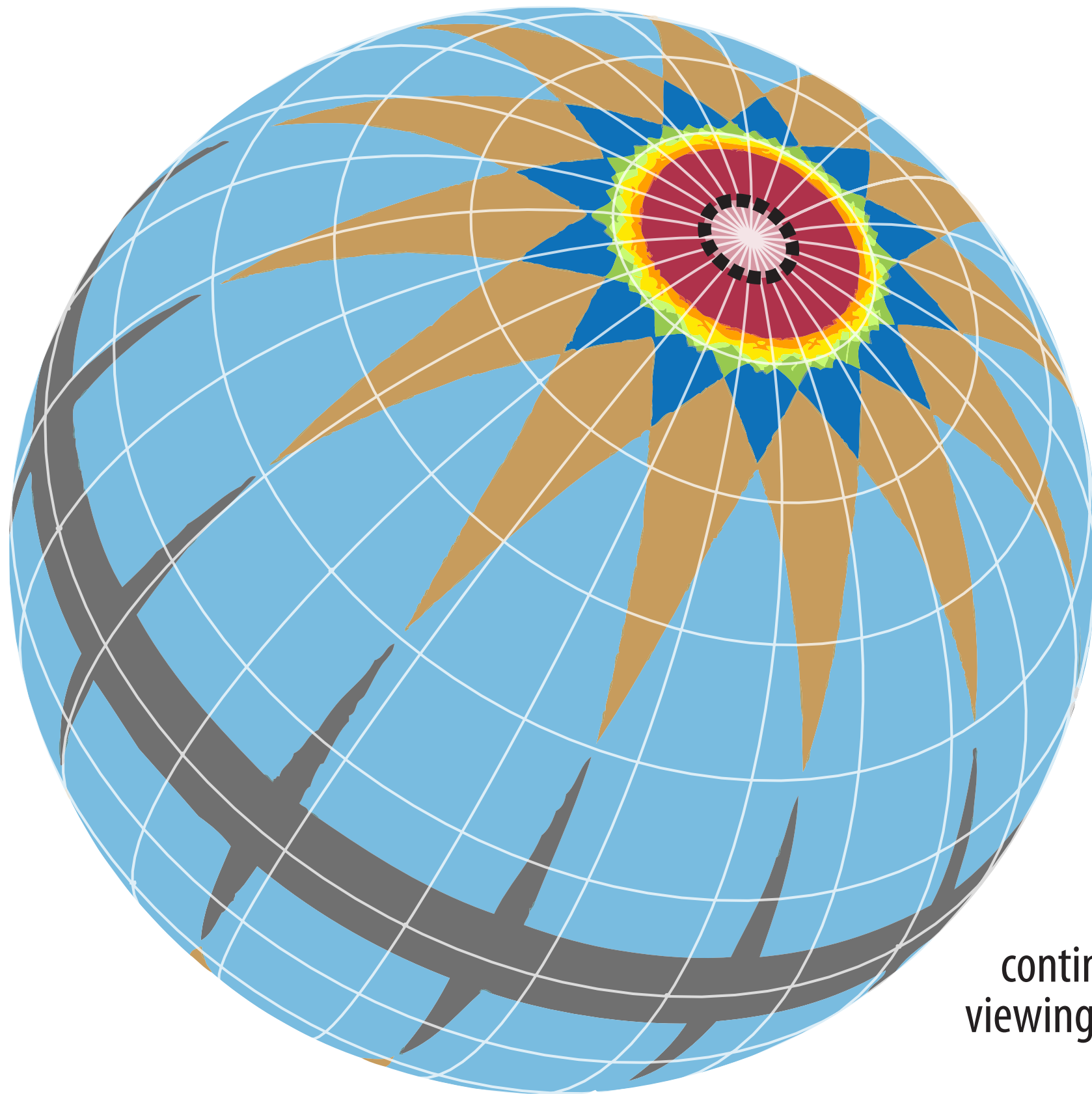
13,756

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27 days



54 days



81 days



108 days



189 days



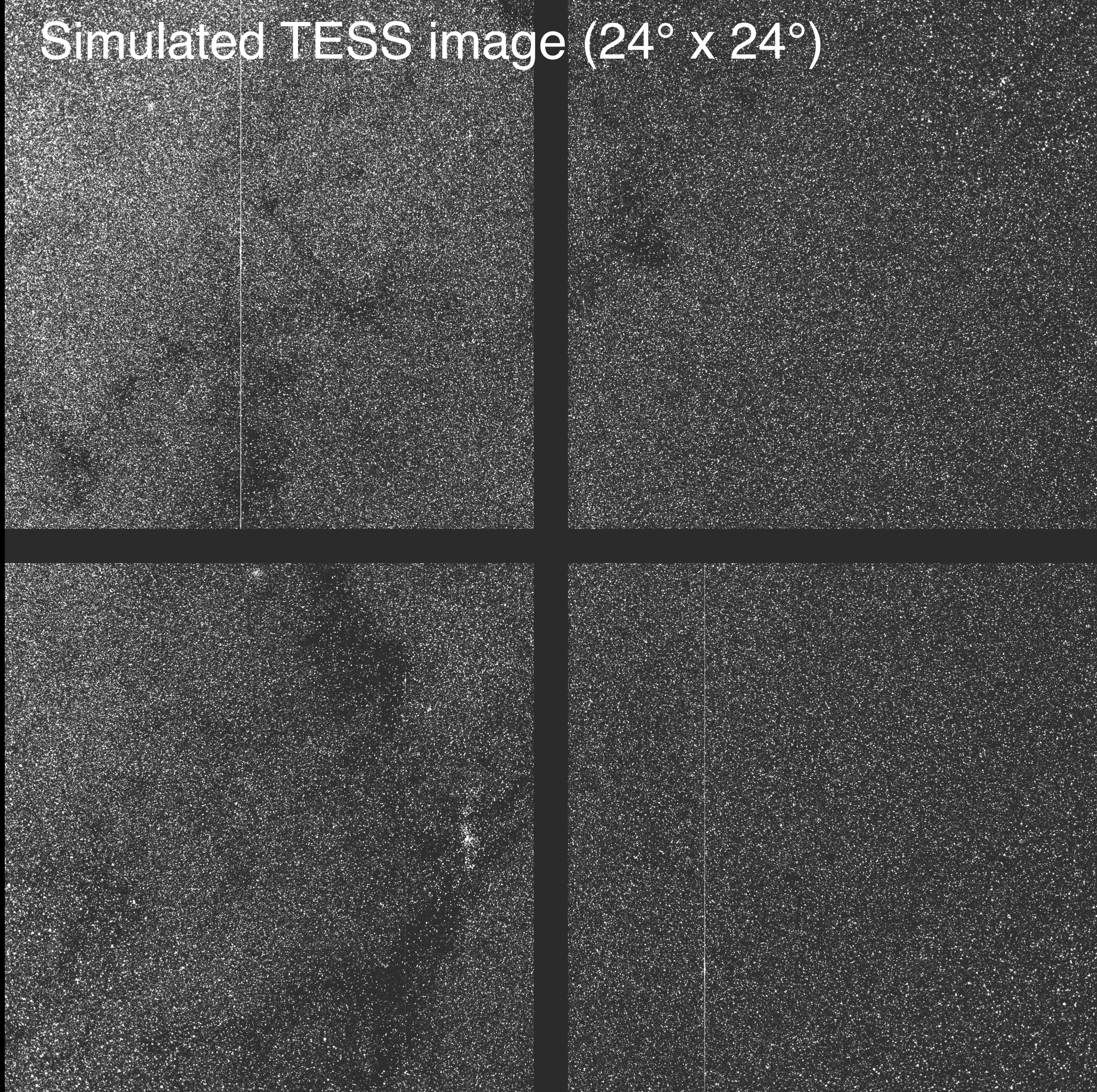
351 days



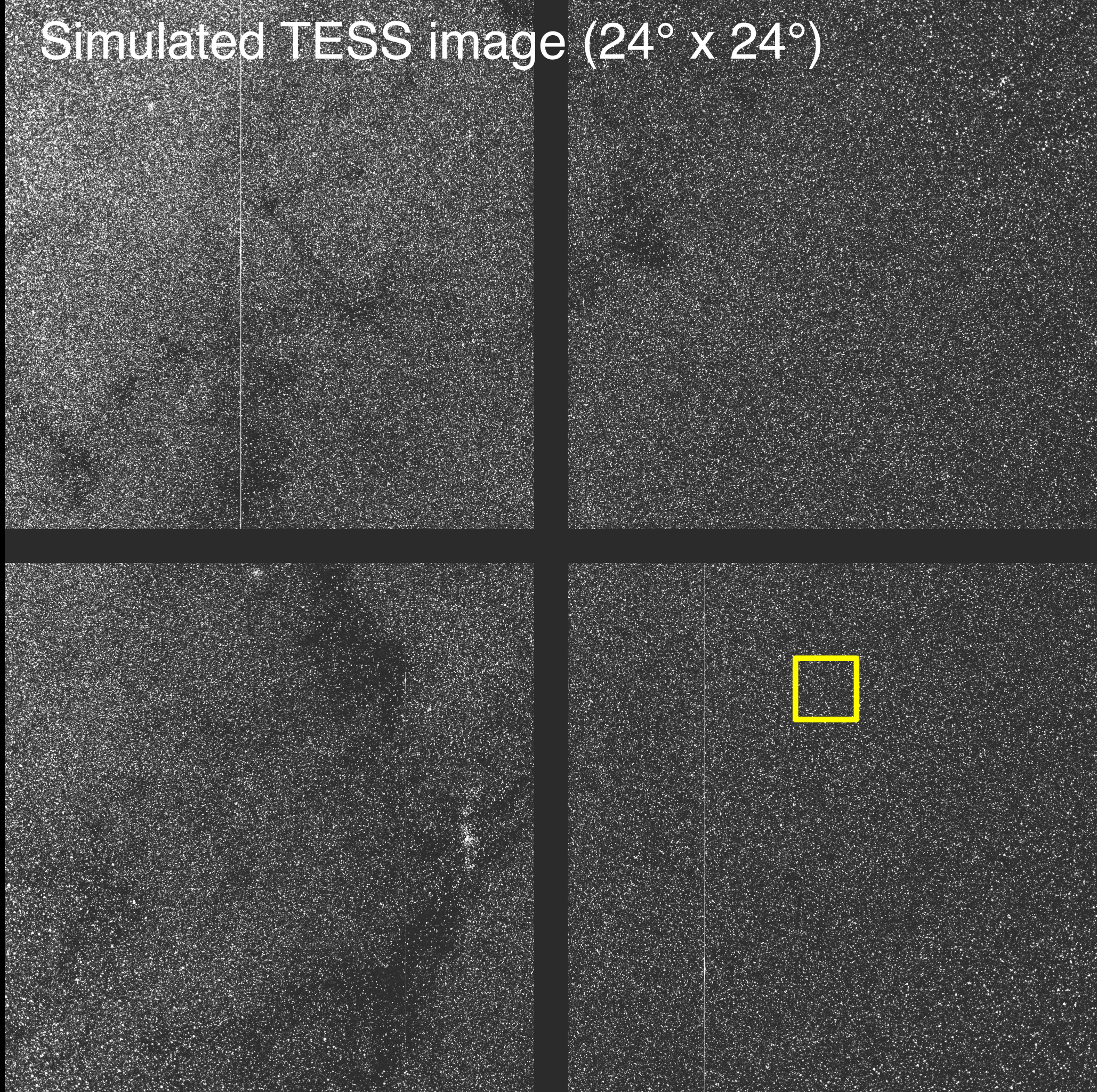
JWST
continuous
viewing zone

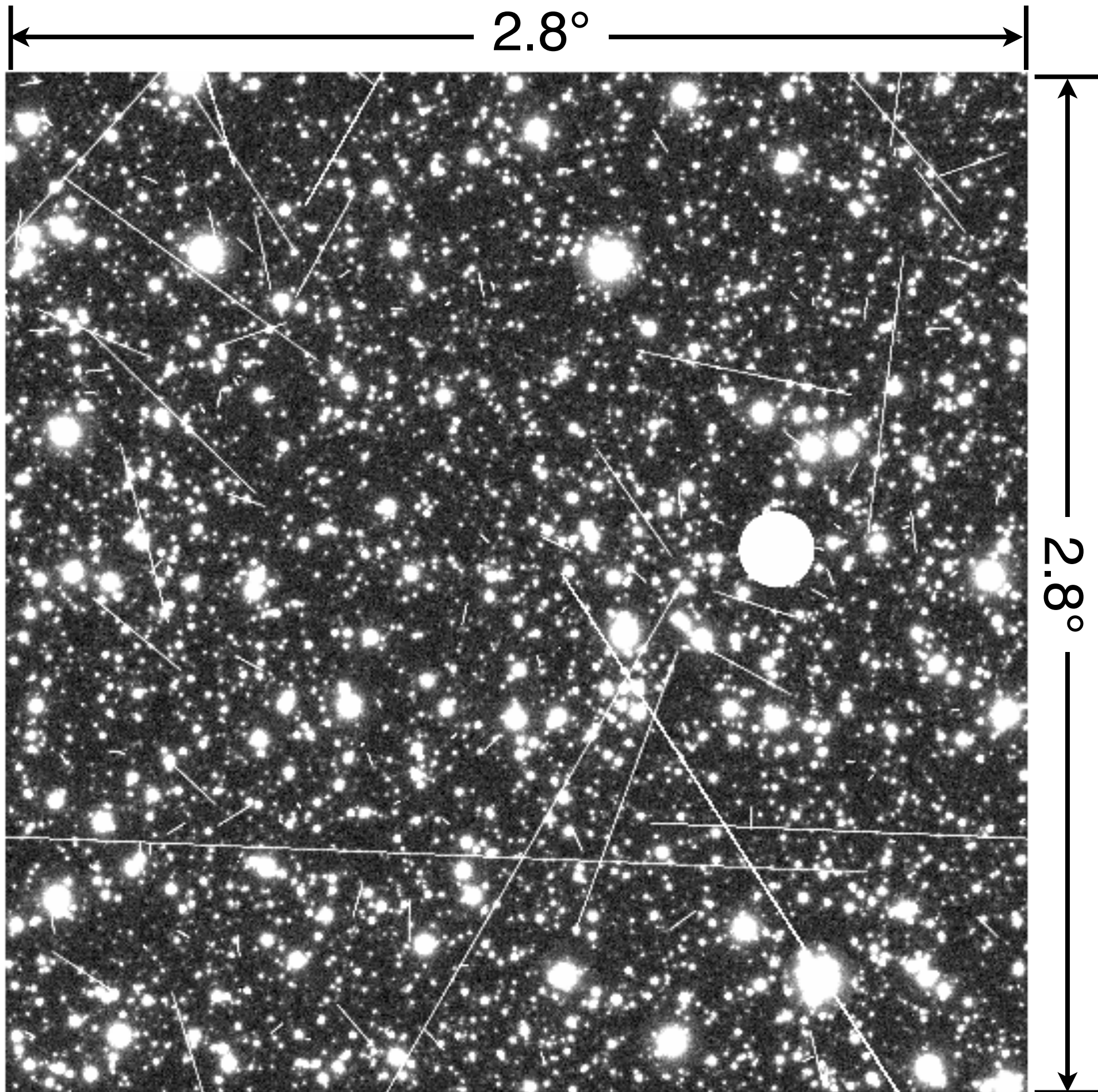


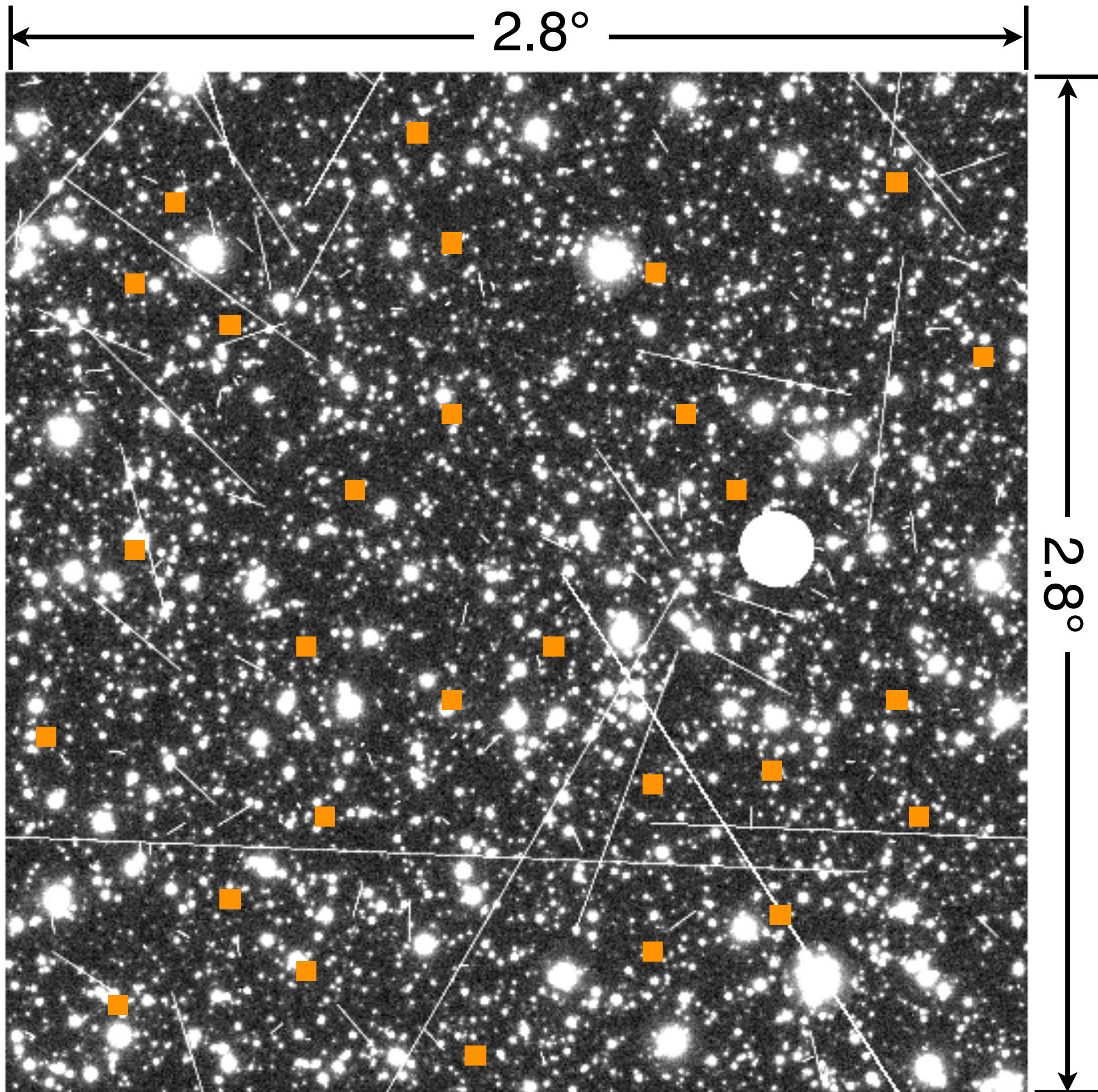
Simulated TESS image (24° x 24°)

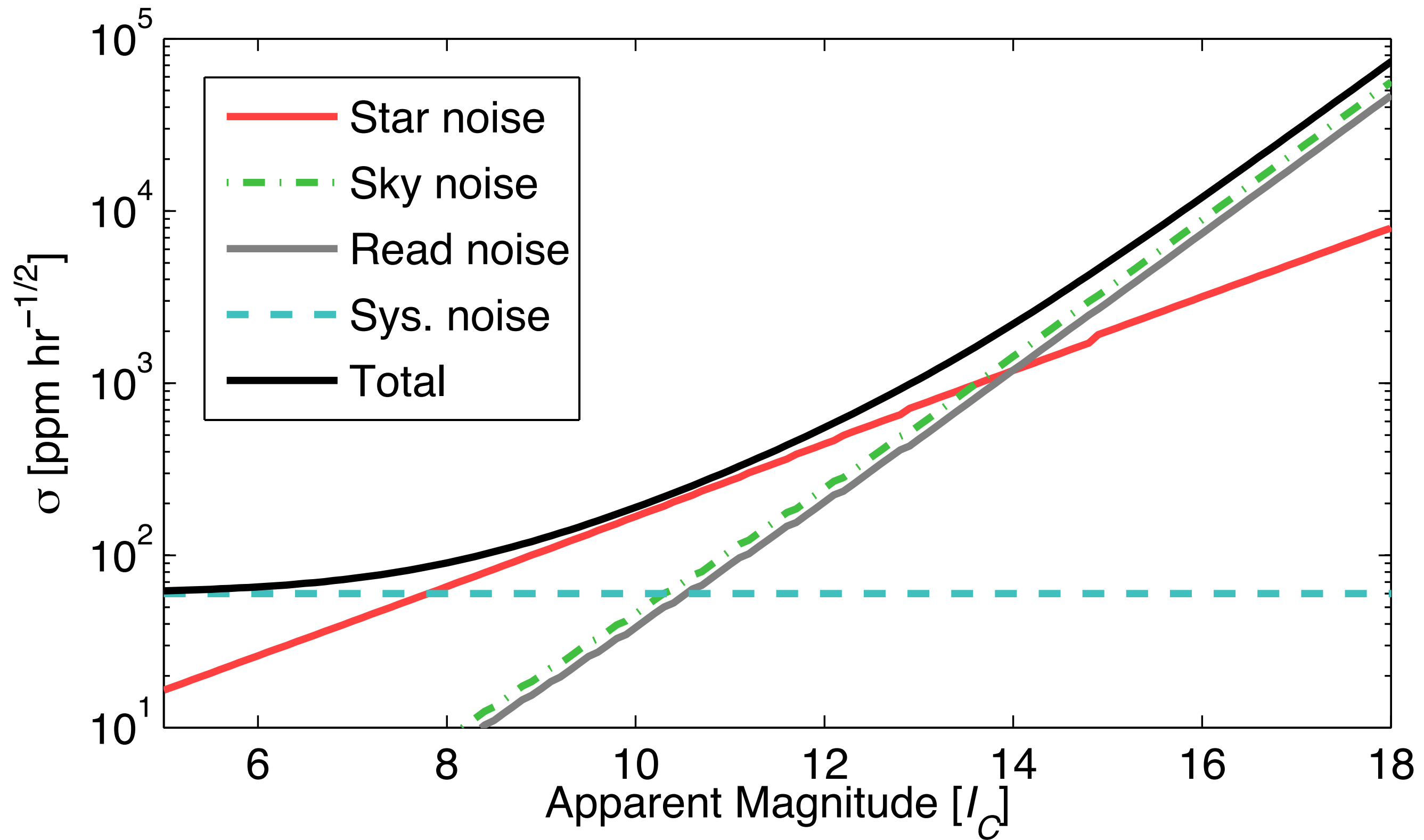


Simulated TESS image (24° x 24°)

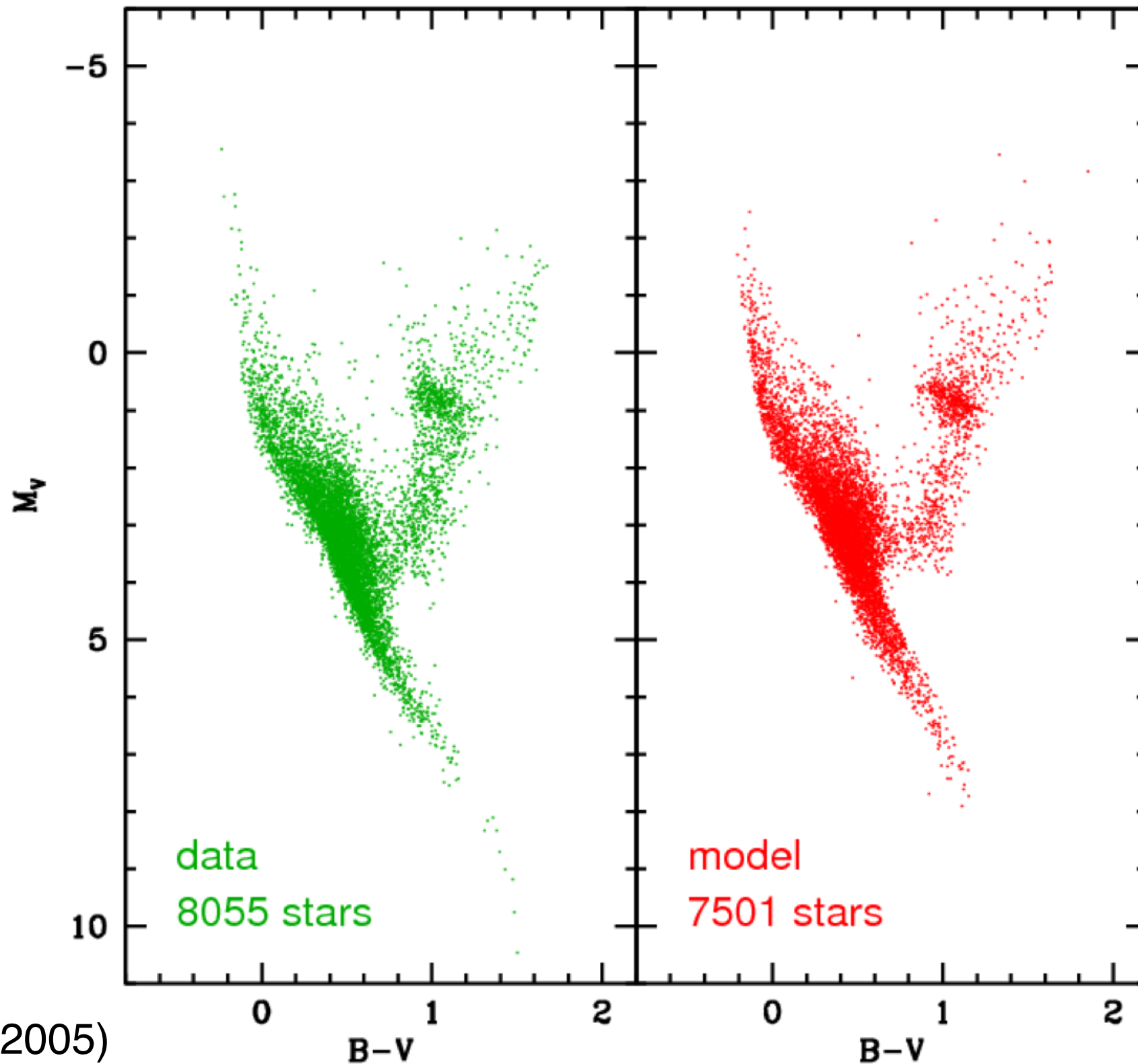




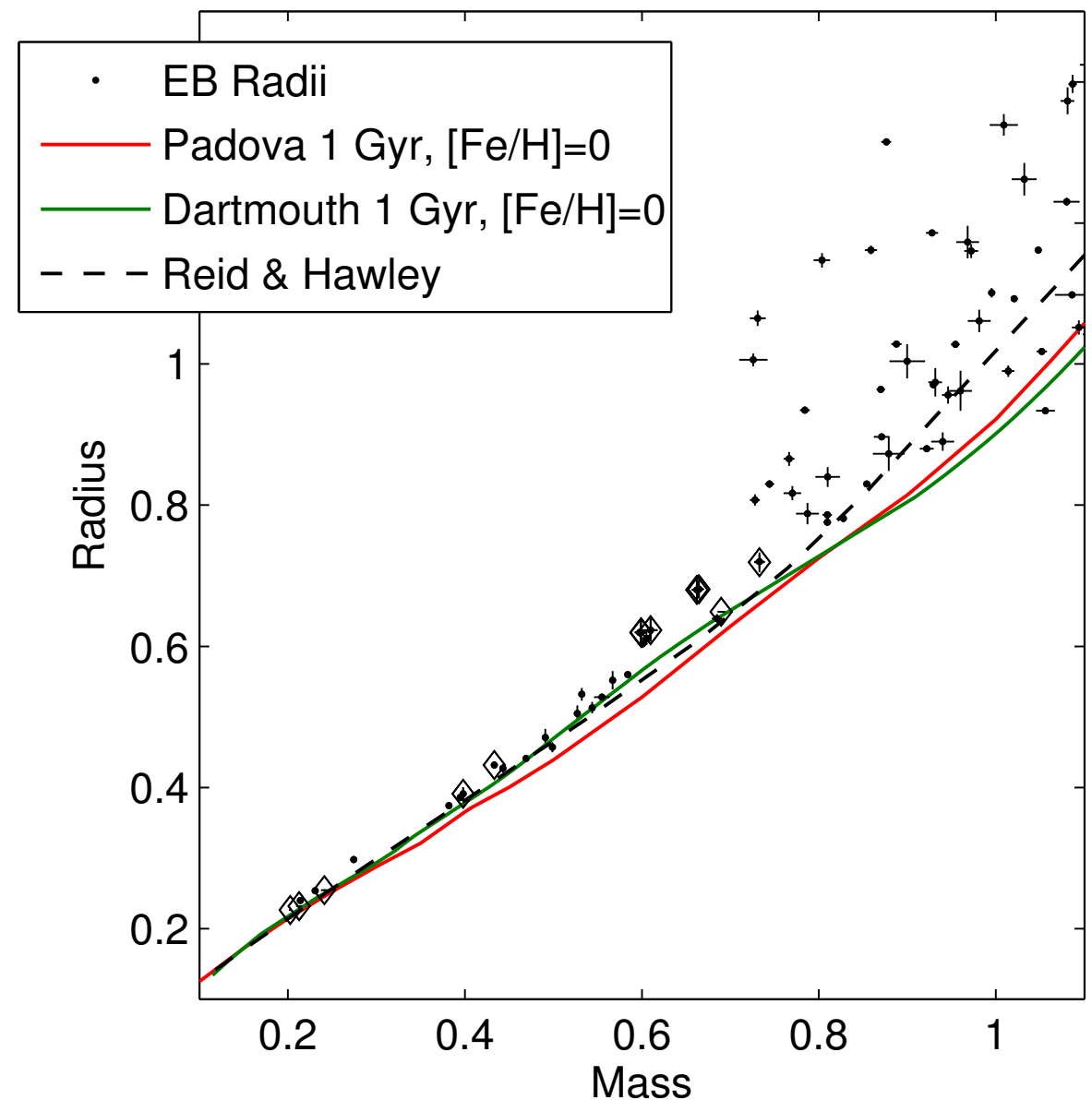
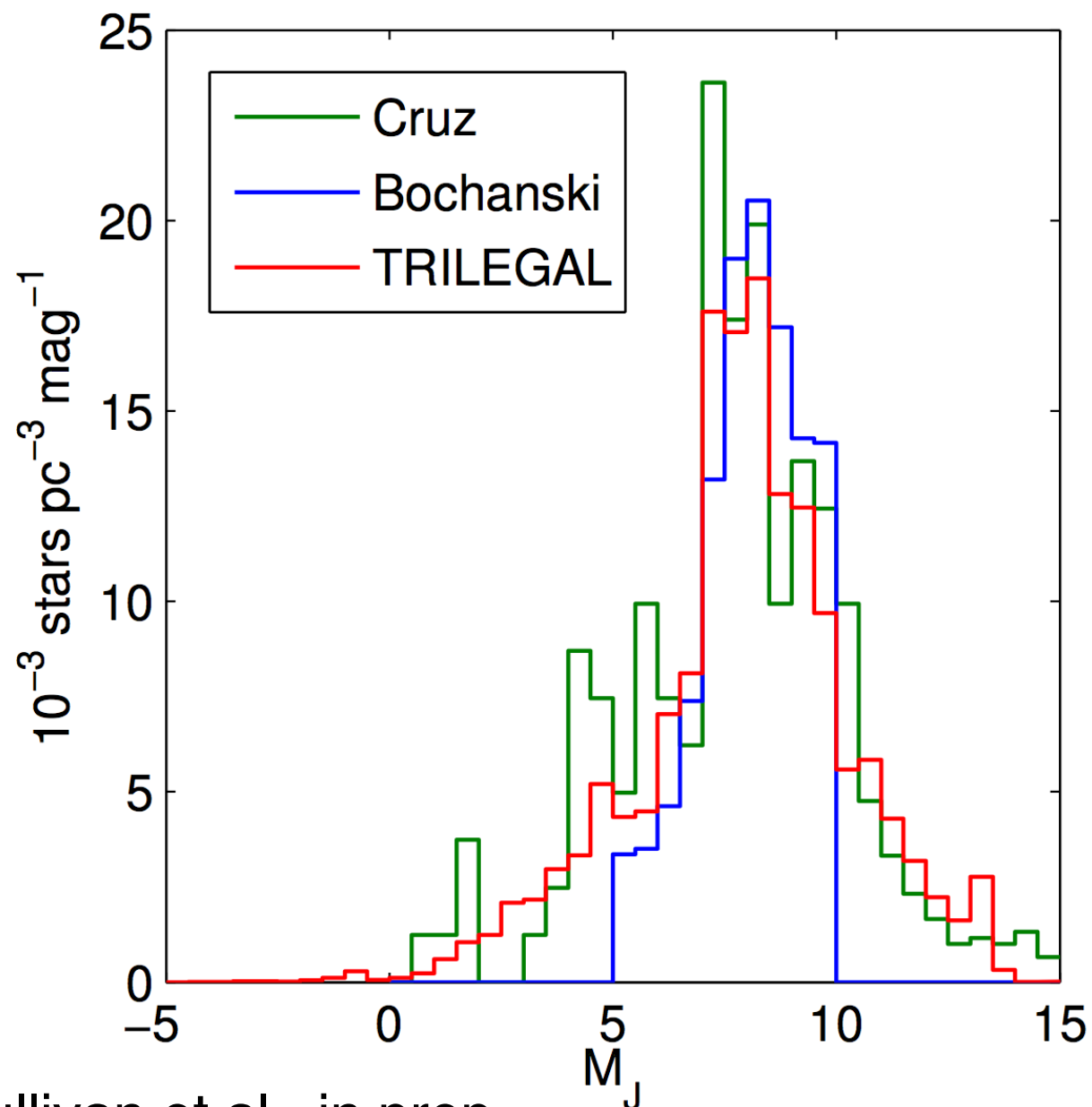




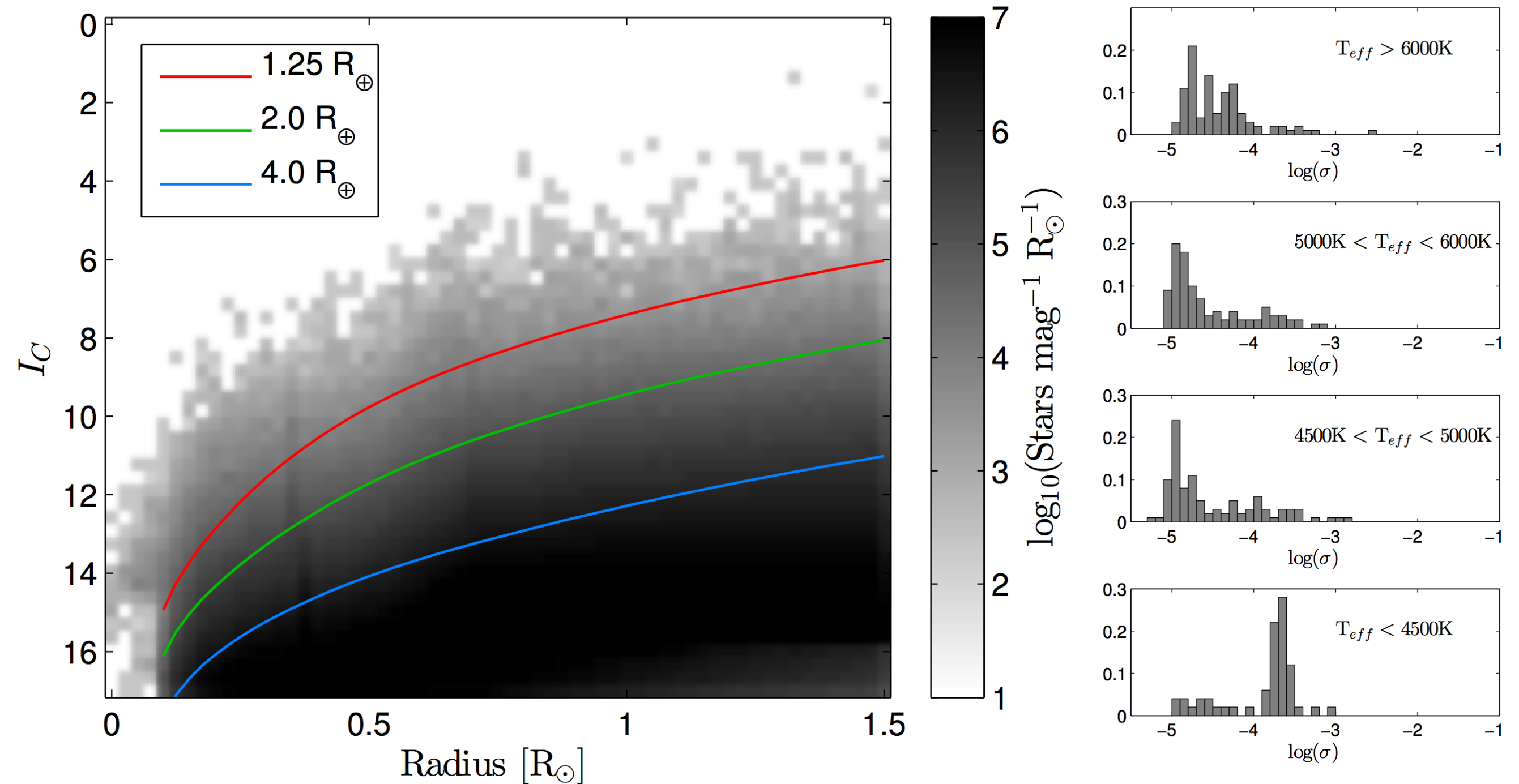
TRILEGAL model of the solar neighborhood



TRILEGAL model of the solar neighborhood enhanced to match M-dwarf data



Simulated stars



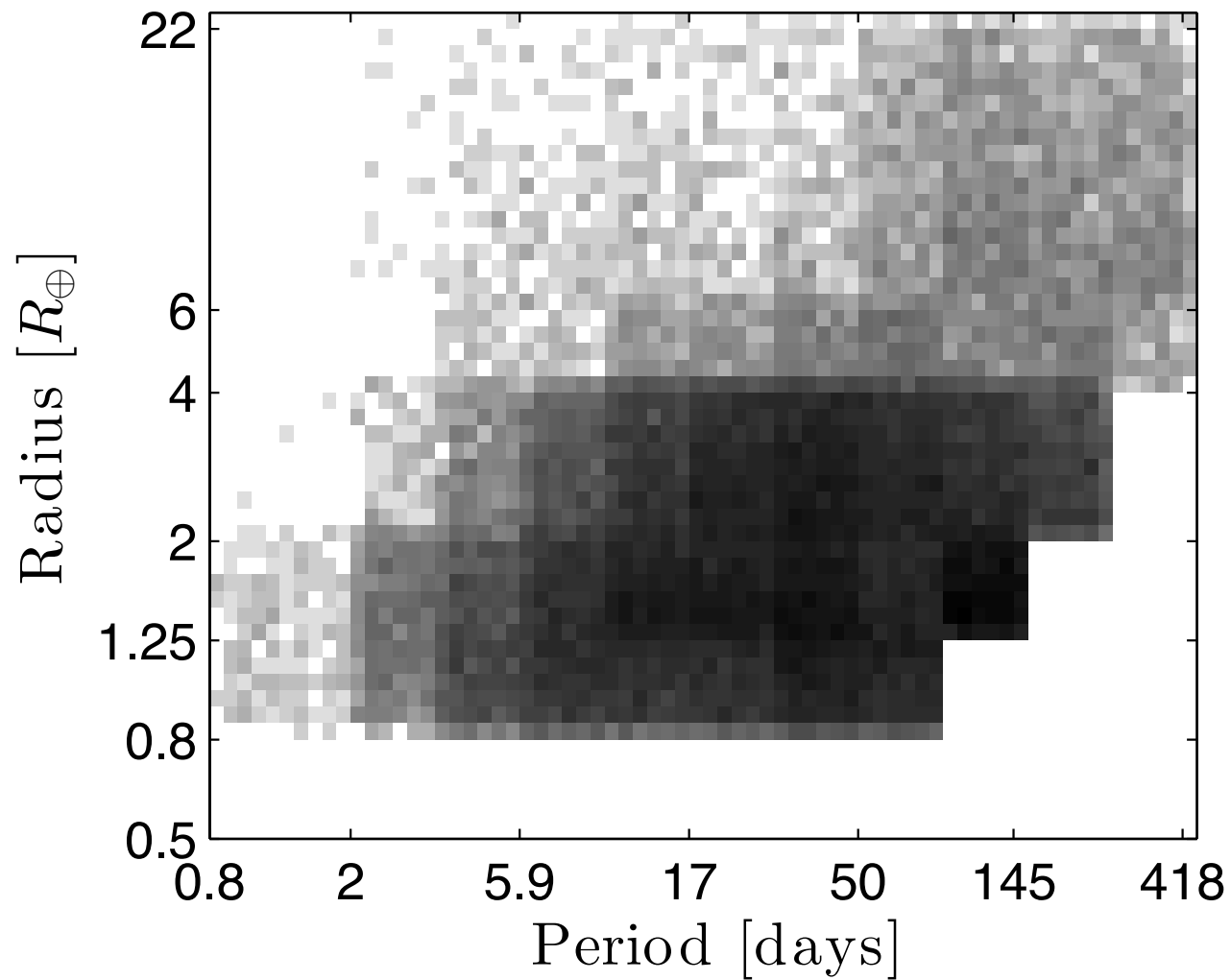
Intrinsic variability

Basri, Walkowicz, & Reiners (2013)

Sullivan et al., in prep.

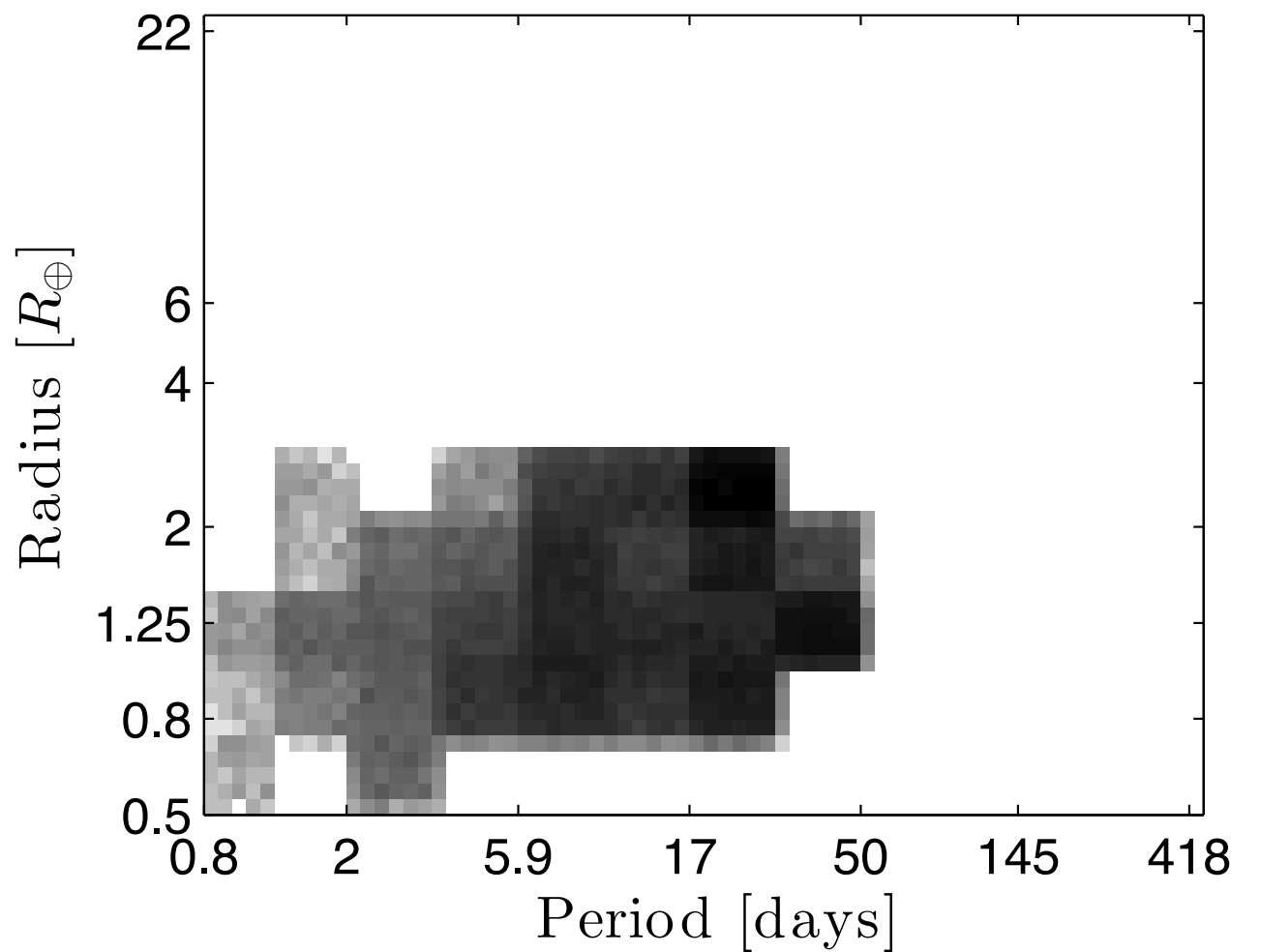
Simulated planets

FGK dwarfs



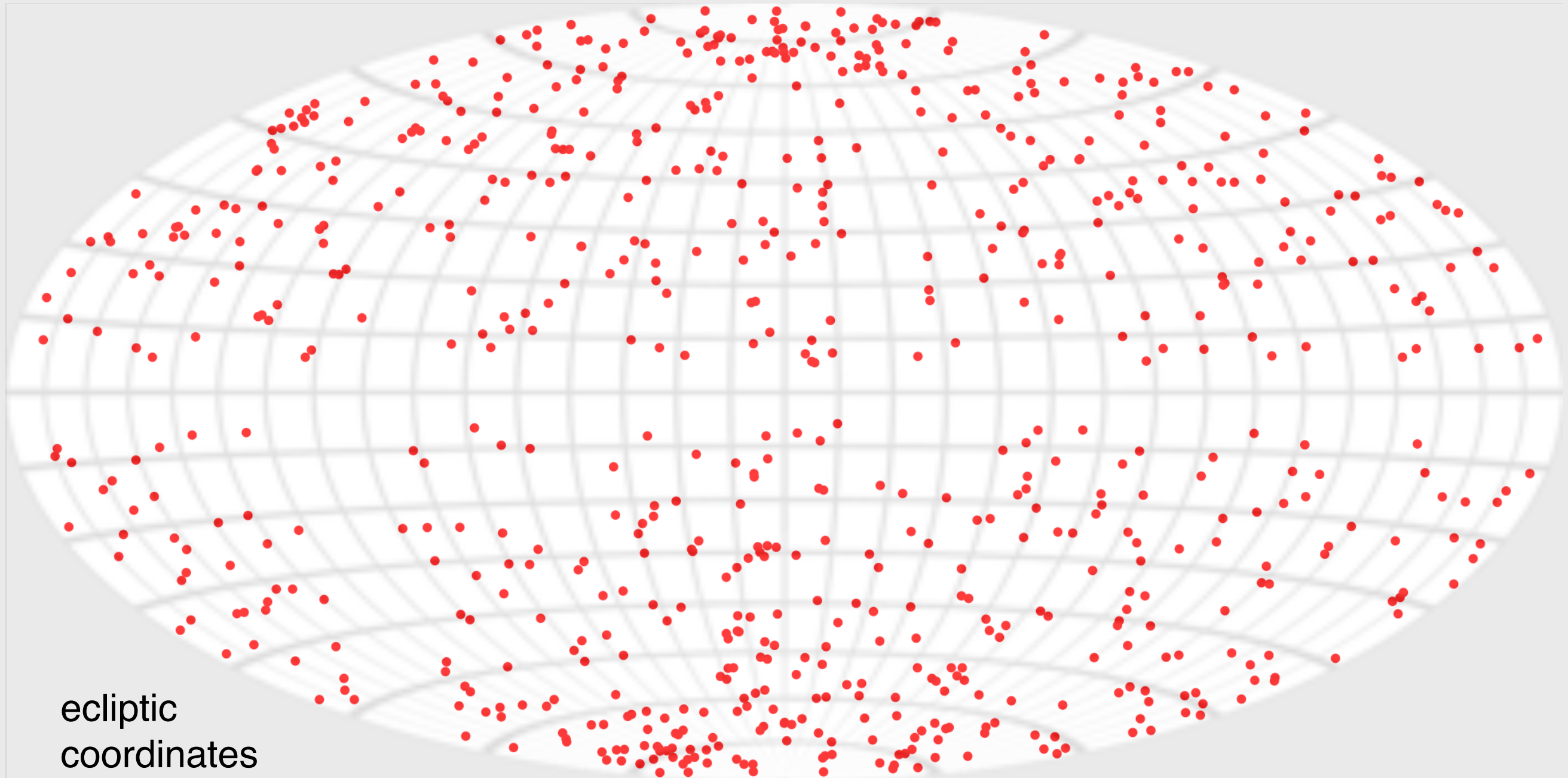
Fressin et al. (2013)

M dwarfs



Dressing & Charbonneau (2013)

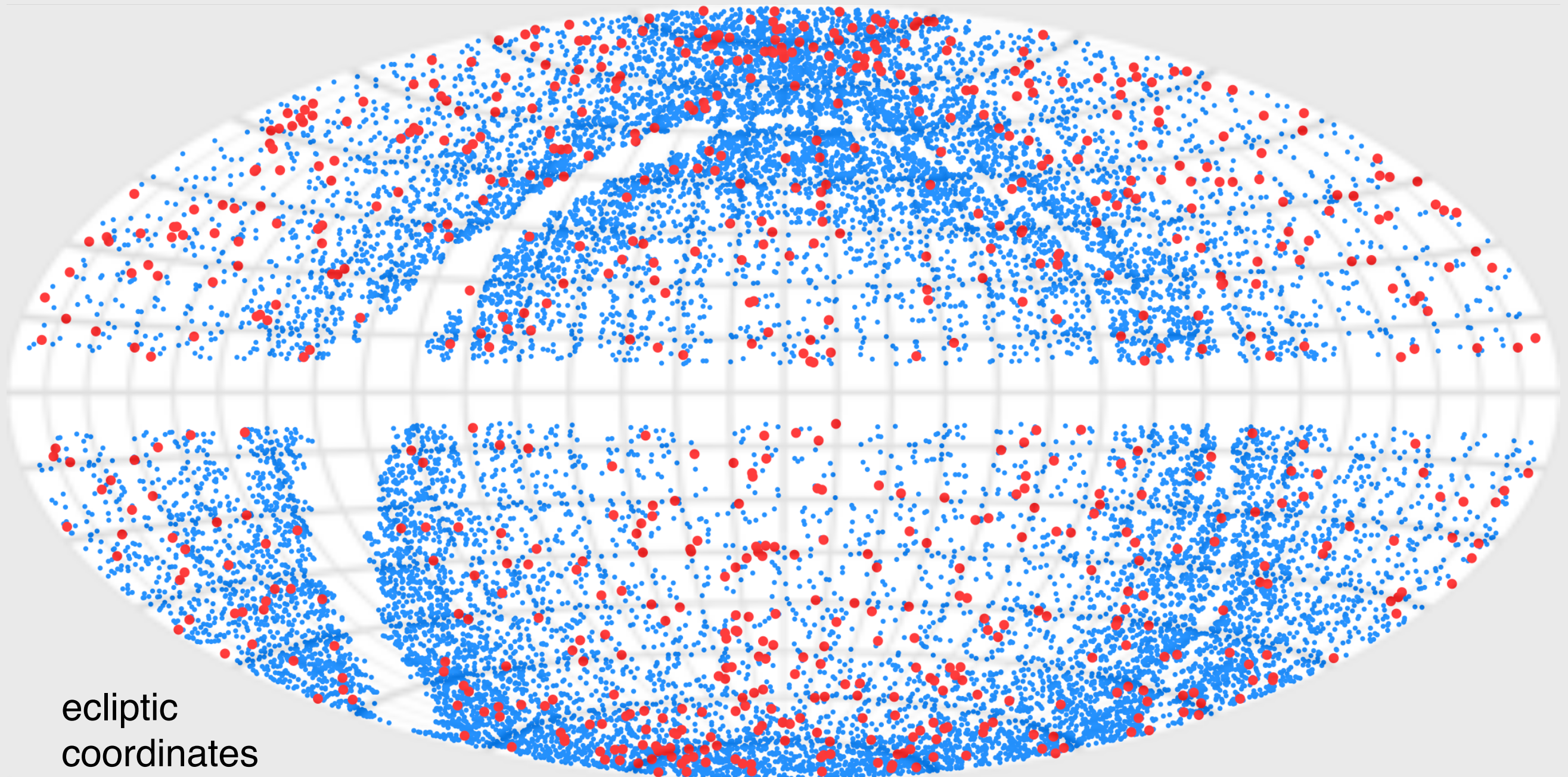
Simulated TESS detections



ecliptic
coordinates

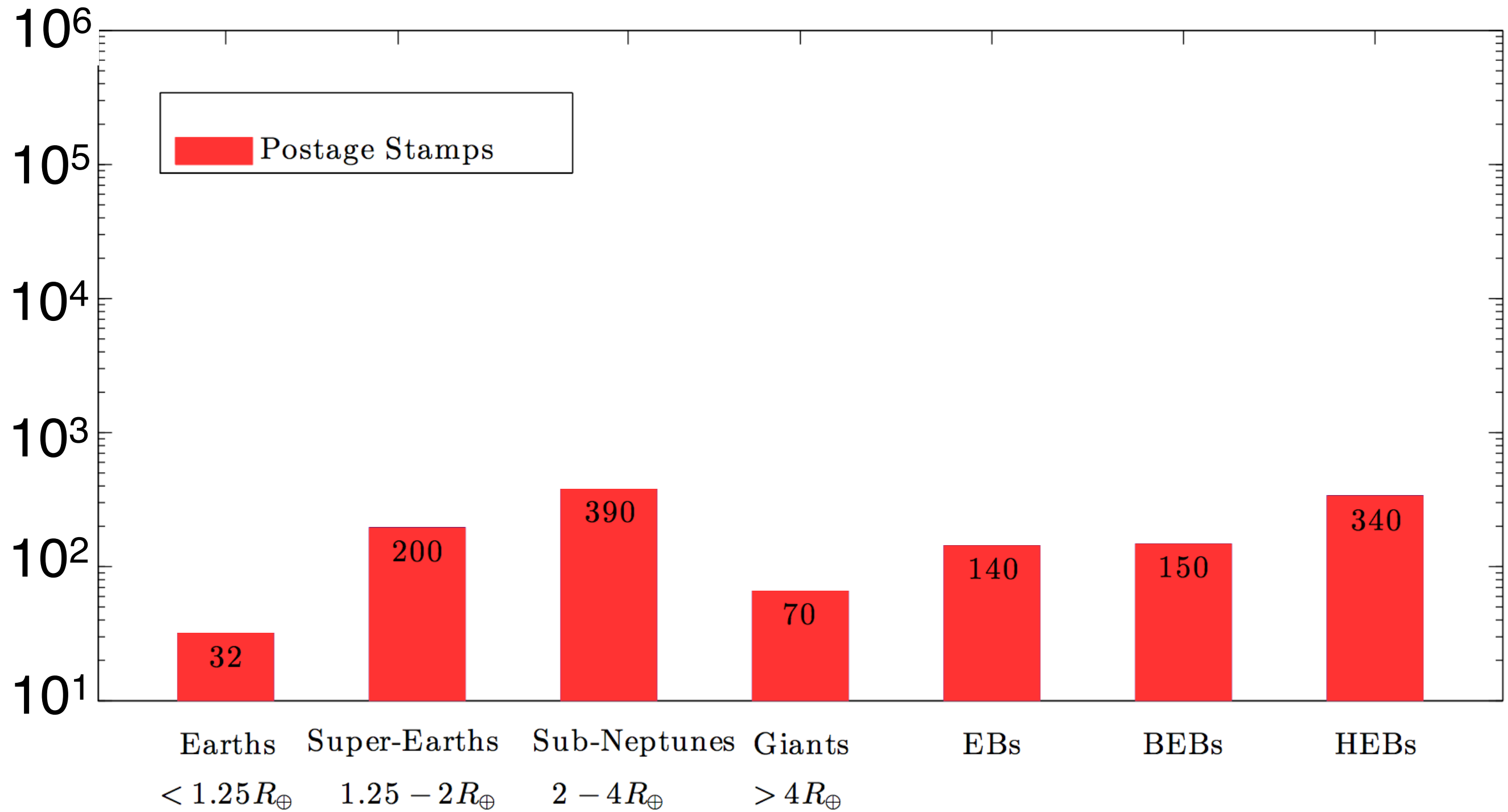
● detectable planets around
pre-selected target stars

Simulated TESS detections

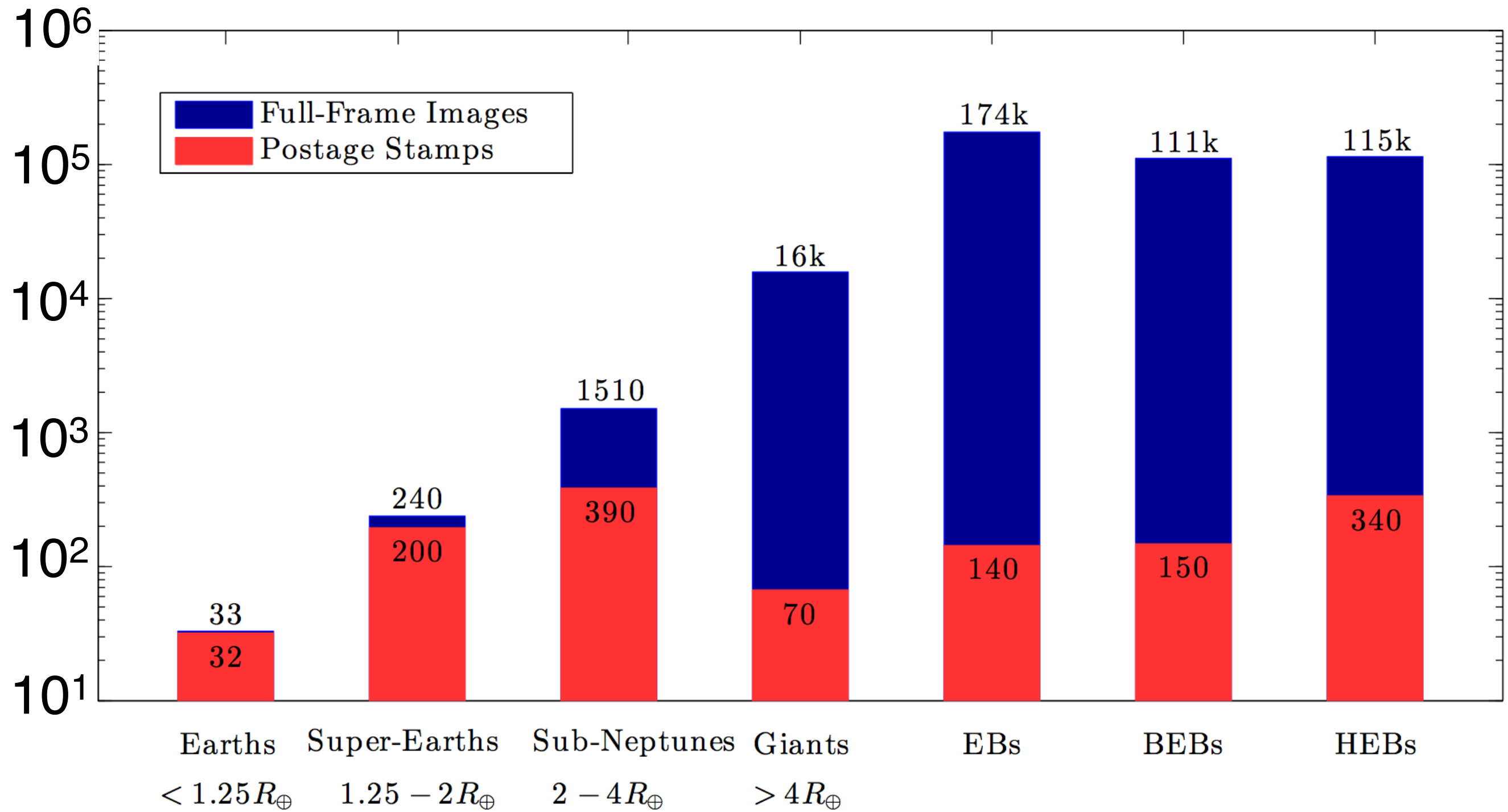


- detectable planets around pre-selected target stars
- detectable planets around other stars in full-frame images

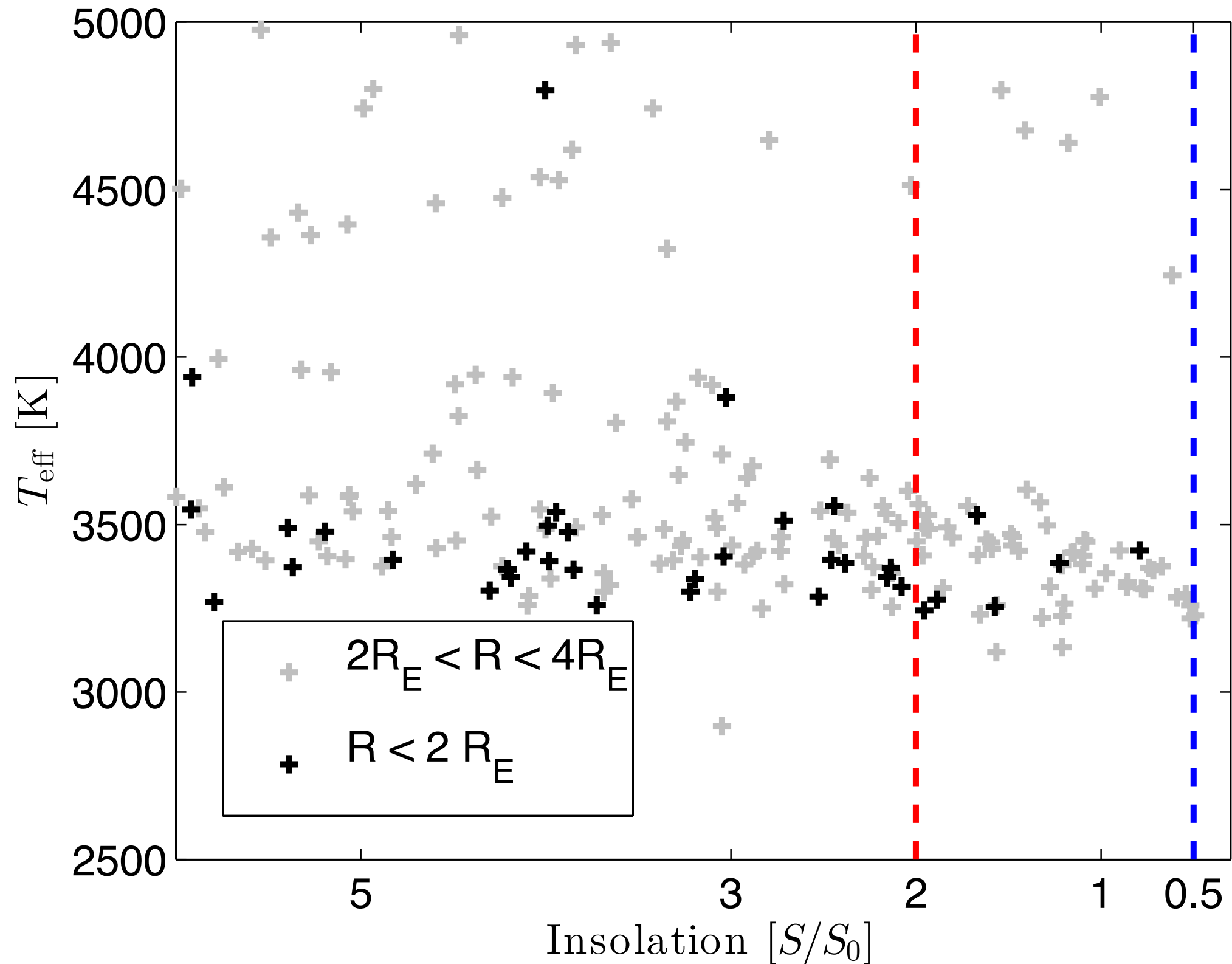
Simulated TESS detections



Simulated TESS detections

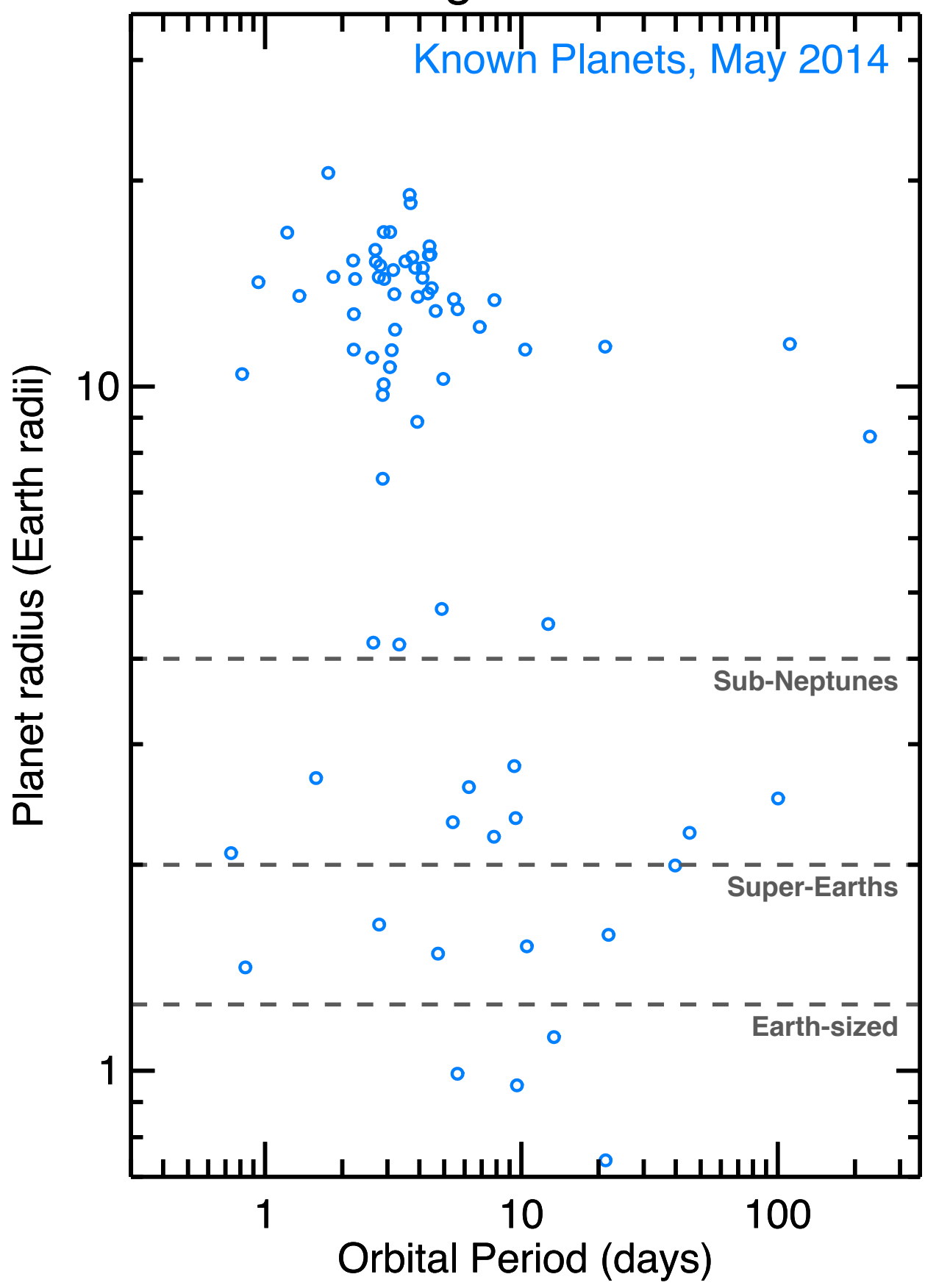


Habitable-zone planets

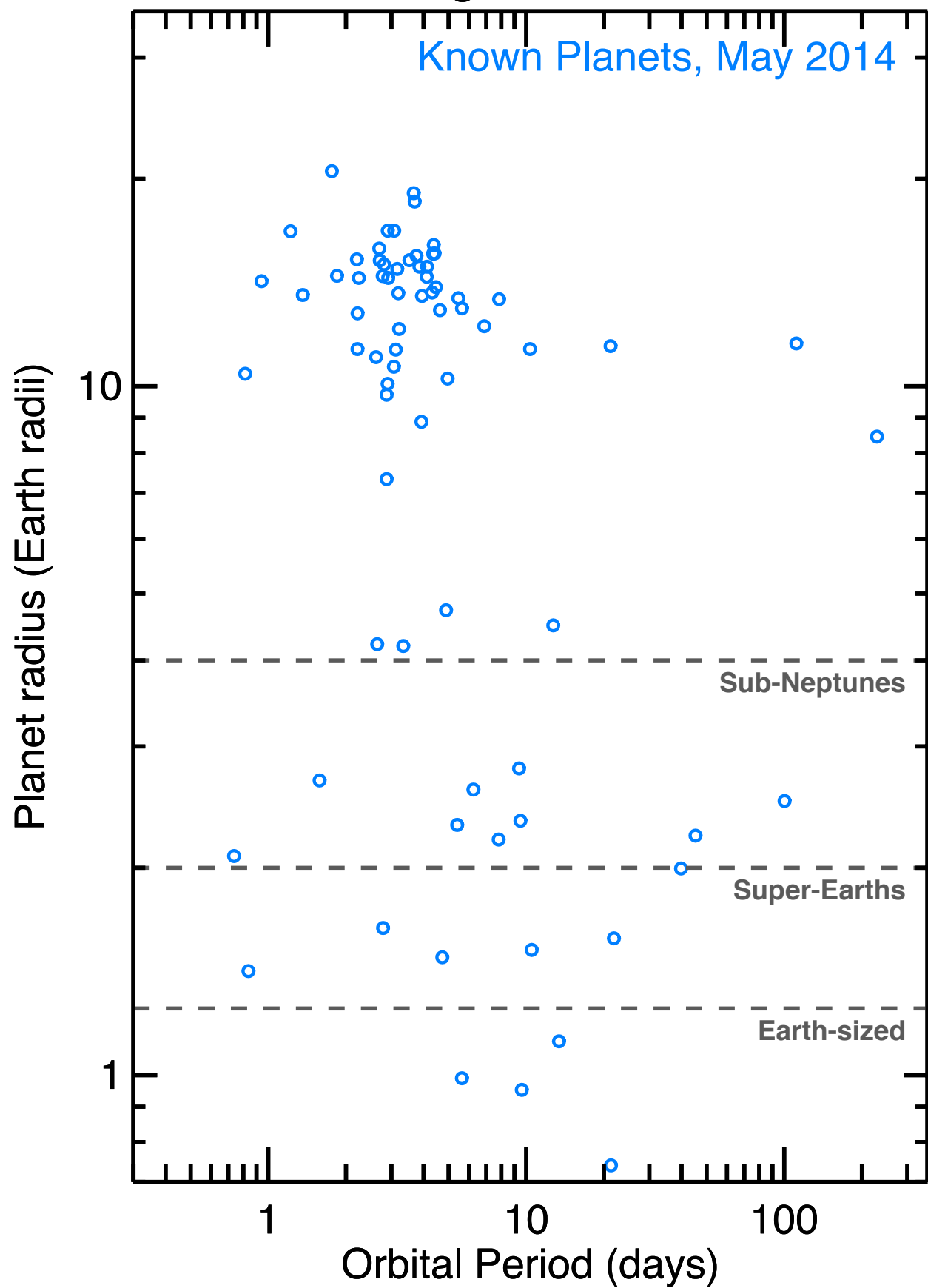


Stars Brighter than J=10

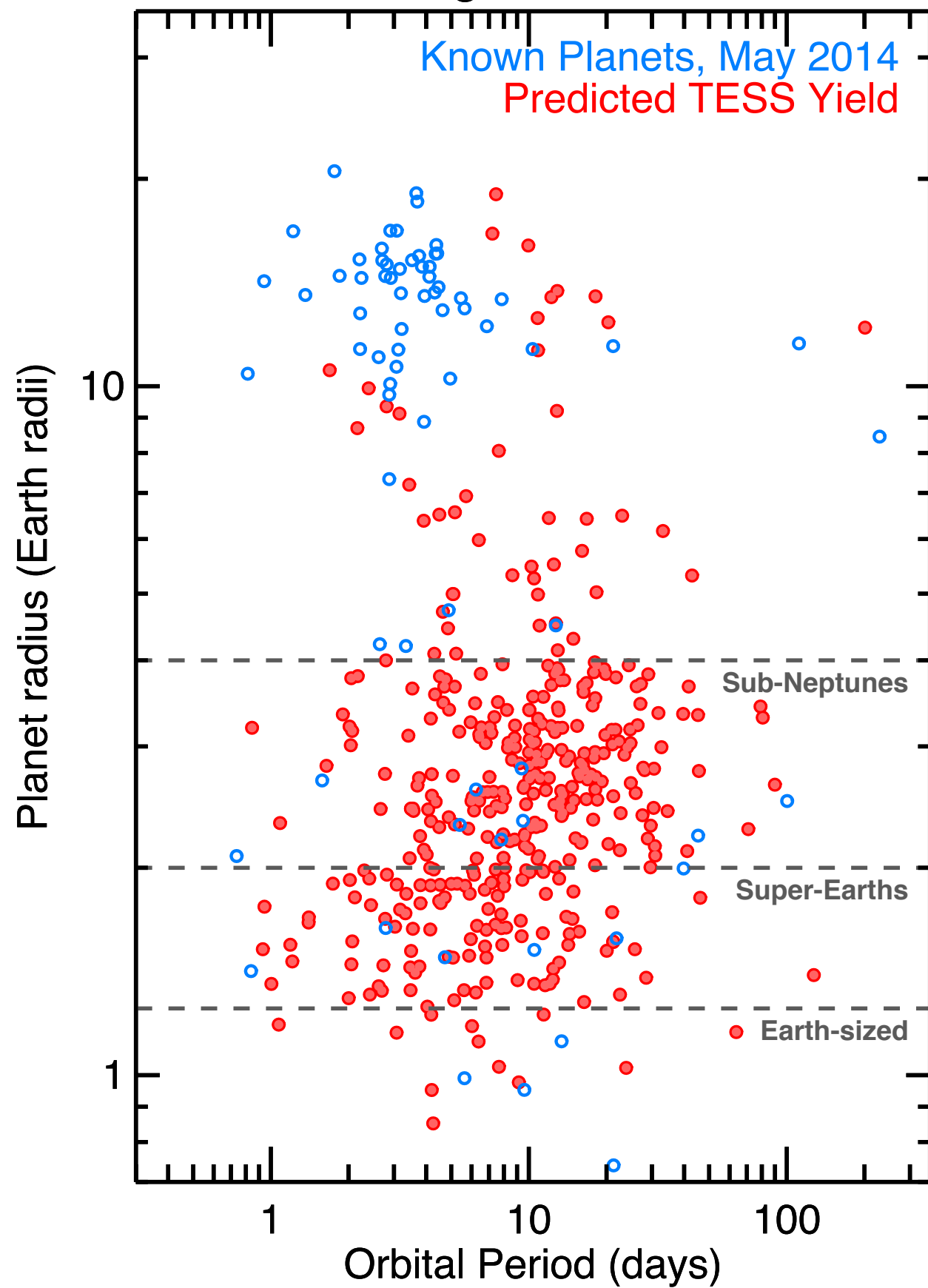
Known Planets, May 2014



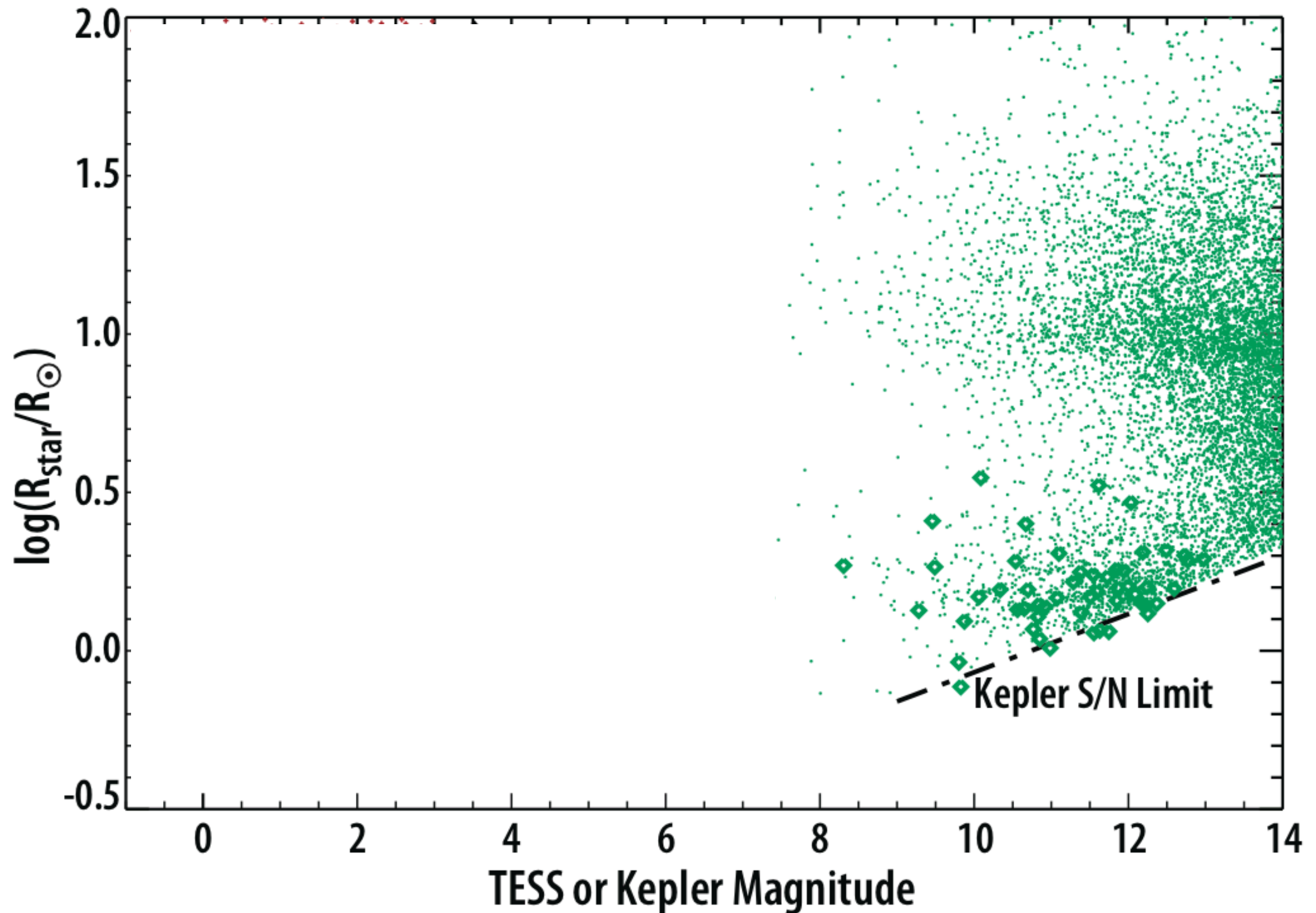
Stars Brighter than J=10



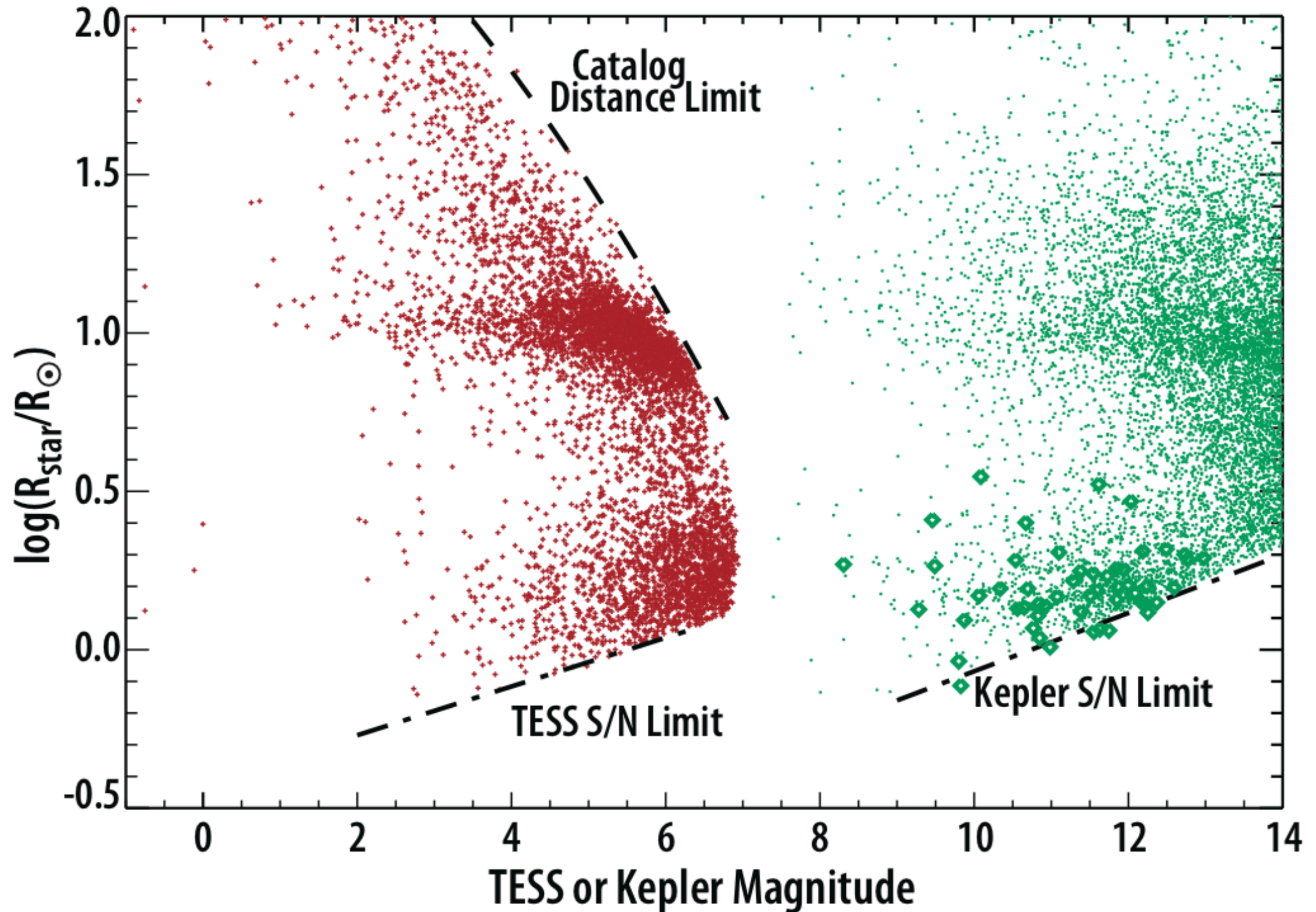
Stars Brighter than J=10



Prospects for p -mode detection



Prospects for p -mode detection



TESS Working Groups

Working group	Chairs
Planet simulations	Josh Winn
Target star selection	Keivan Stassun, Josh Pepper
Follow-up observations	Dave Latham
Asteroseismology	Jørgen Christensen-Dalsgaard, Hans Kjeldsen
“Serendipitous” science	Peter McCullough, Garrett Jernigan
Atmospheric characterization	Jacob Bean
Habitability	Lisa Kaltenegger
Eclipsing binaries	Bill Welsh, Nader Haghighipour

Exoplanet Missions



Ground-based Observatories

Hubble

Spitzer

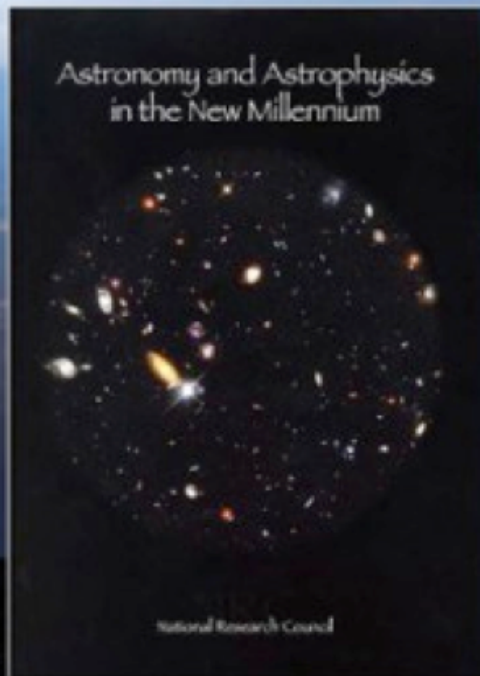
Kepler

TESS

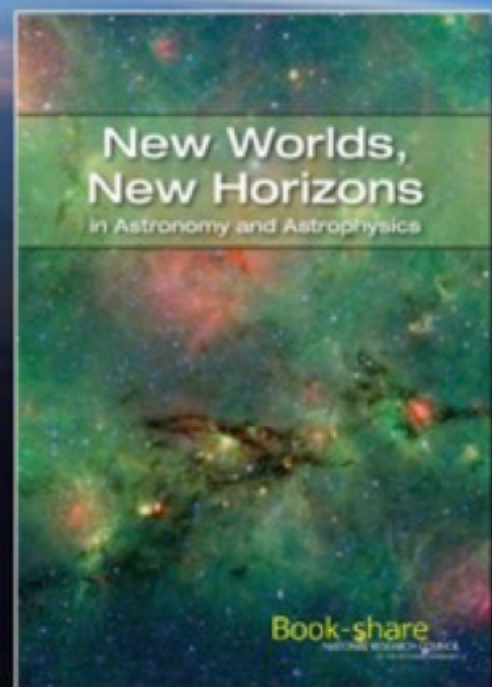
JWST

AFTA

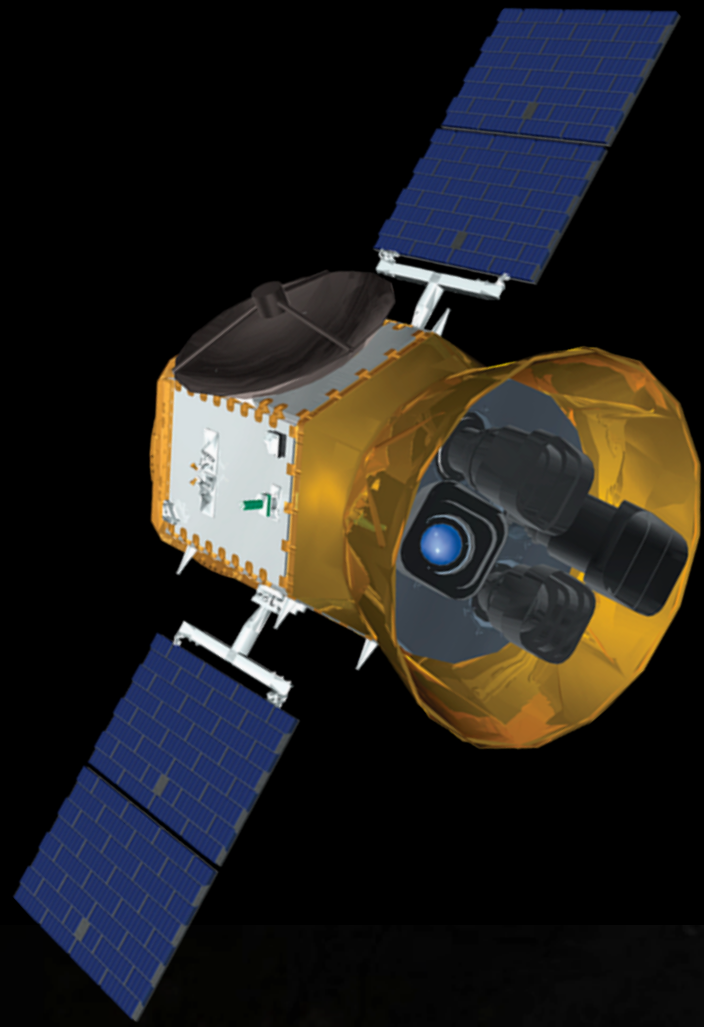
New Worlds Telescope



2001 Decadal Survey



2010 Decadal Survey



Science with the Transiting Exoplanet Survey Satellite

2015 Sep. 30 & Oct. 1 (tentative)

Cambridge, MA



Ground-based follow-up program

TESS data delivered to MAST within 4 months

LCOGT, MEarth,
Euler 1.2m, FLWO 1.2m

LCOGT, Euler 1.2m,
OHP, FLWO 1.5m

HARPS, HARPS-North,
Keck, Magellan...

DETECTION ≈ 5000 transit-like signals ($R_p < 4 R_E$)

≈ 2000 survive direct imaging

≈ 500 survive reconnaissance spectroscopy

VALIDATION

100

small planets selected for precise Doppler spectroscopy

50

measured masses

