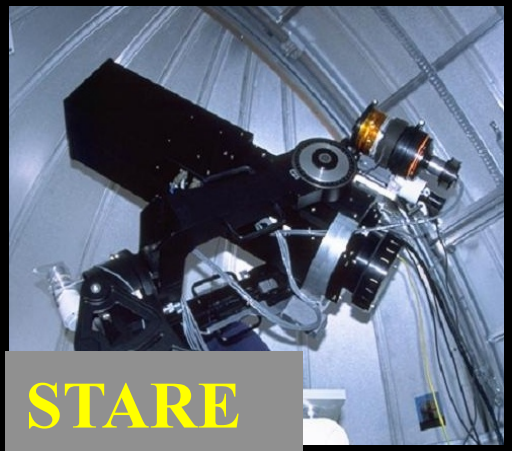
Feeding the greedy "Giants" with transiting planets

UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES
Département d'astronomie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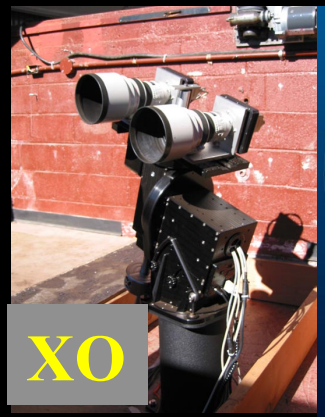
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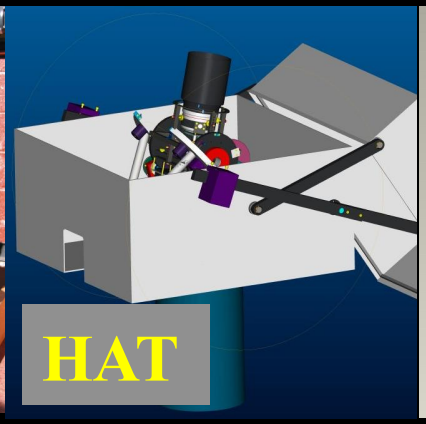
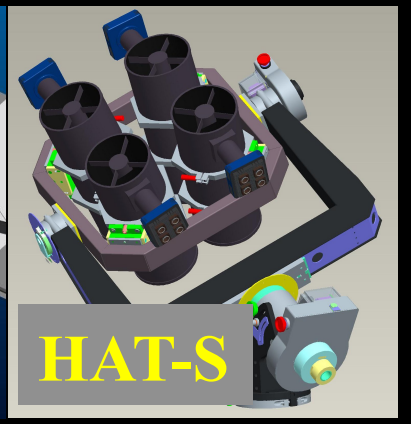
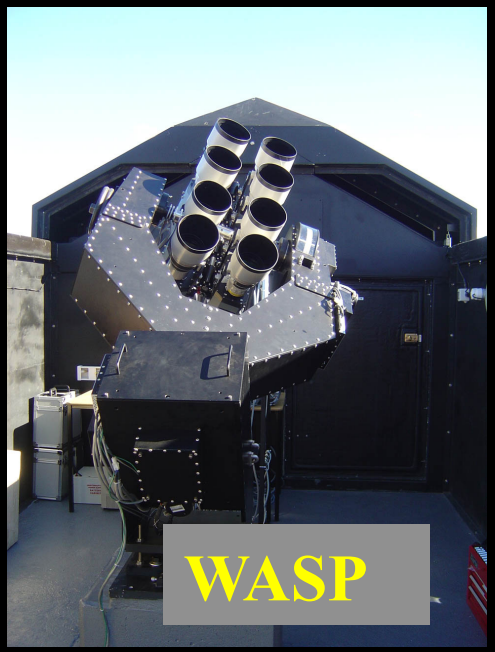

HAT

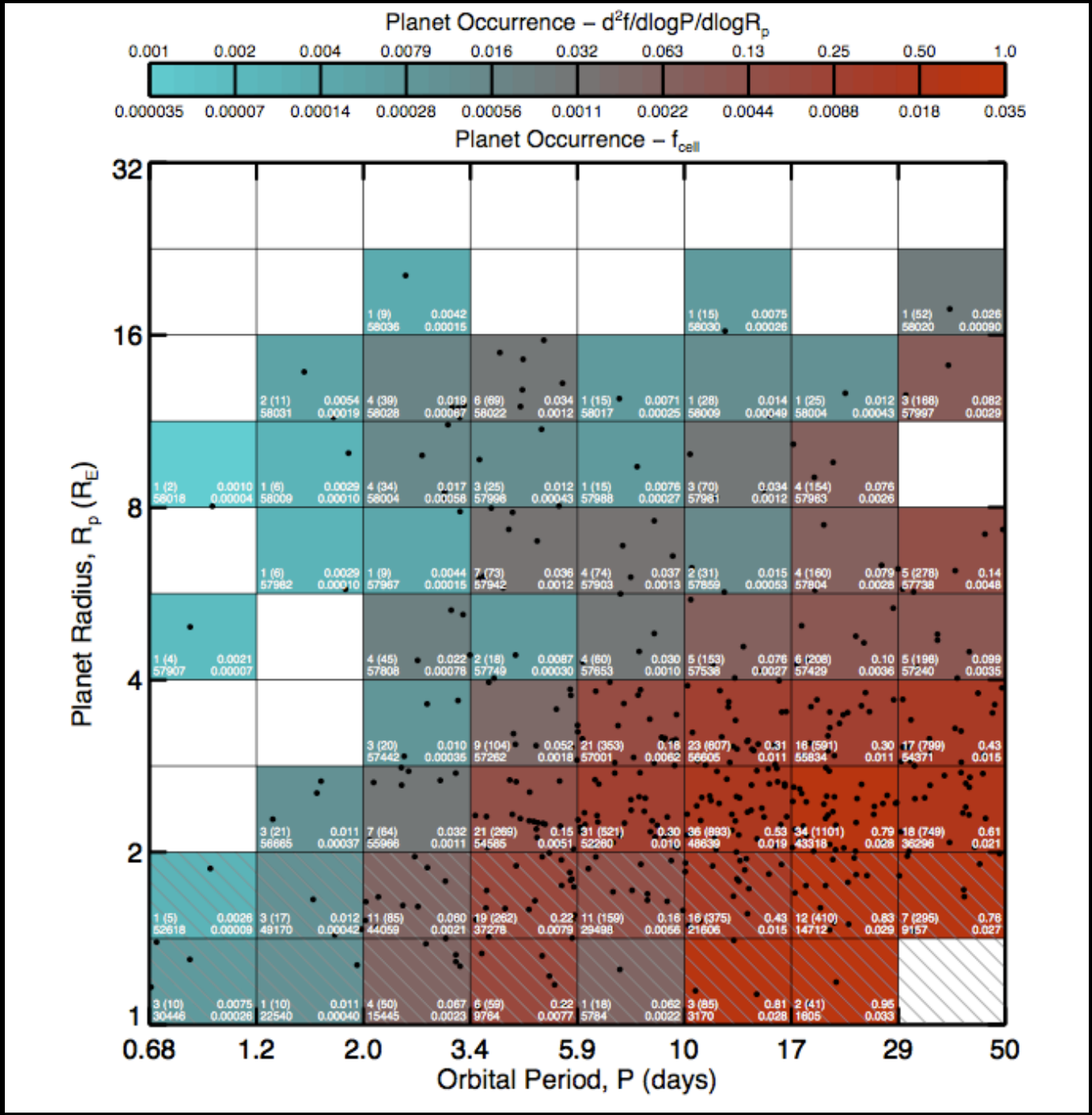

HAT-S


WASP

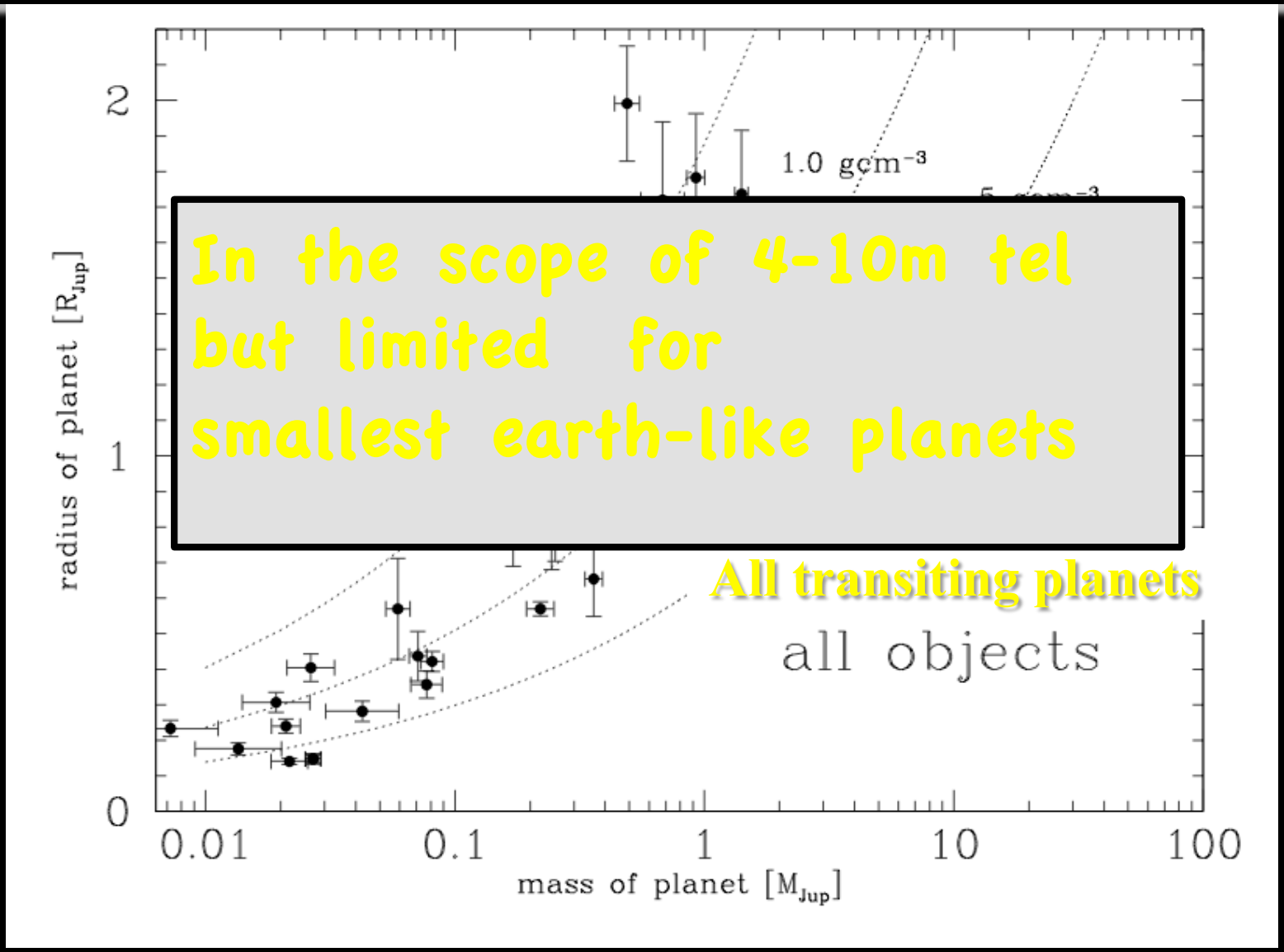

CoRoT


Kepler

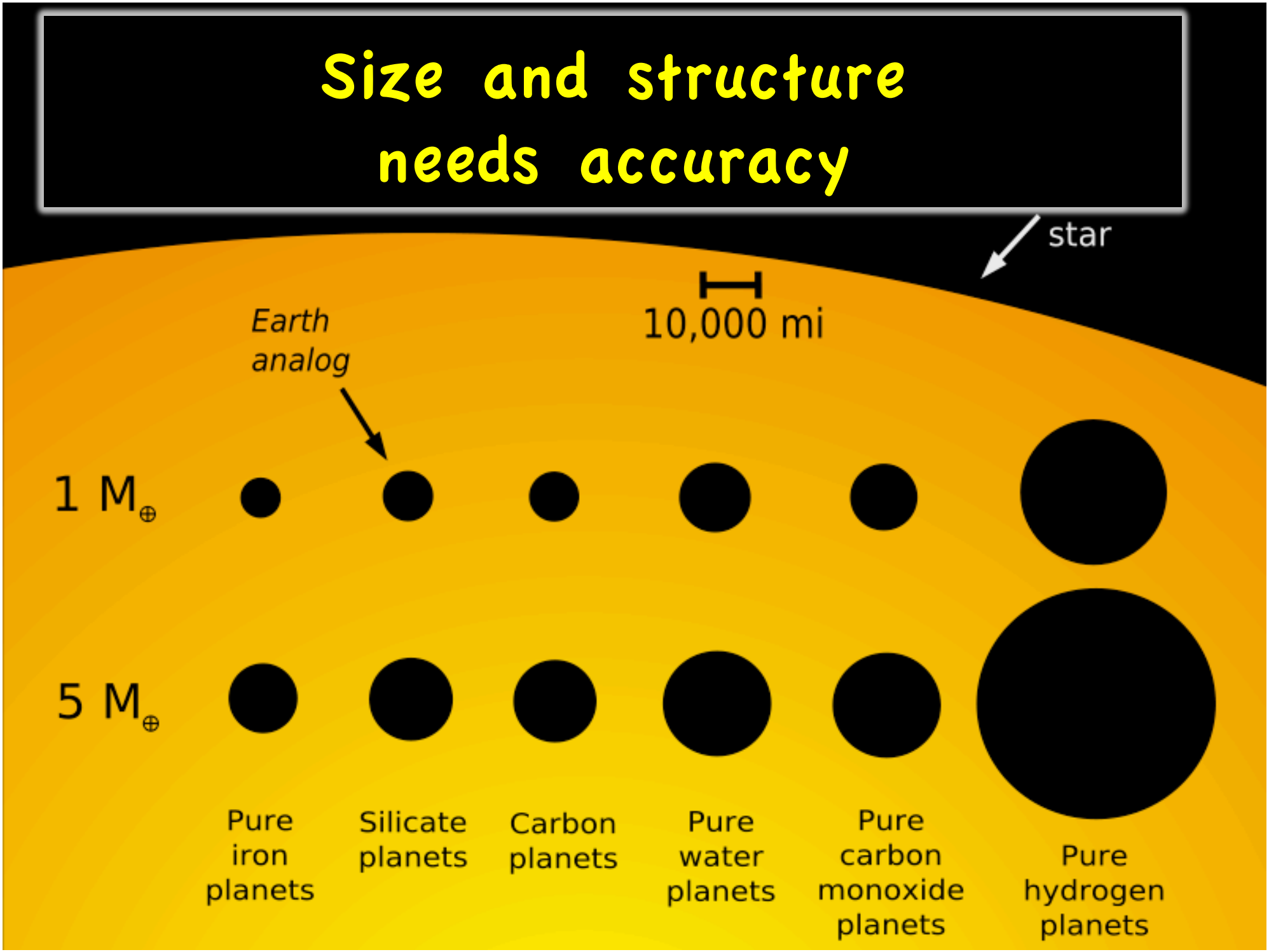
Howard et al 2011



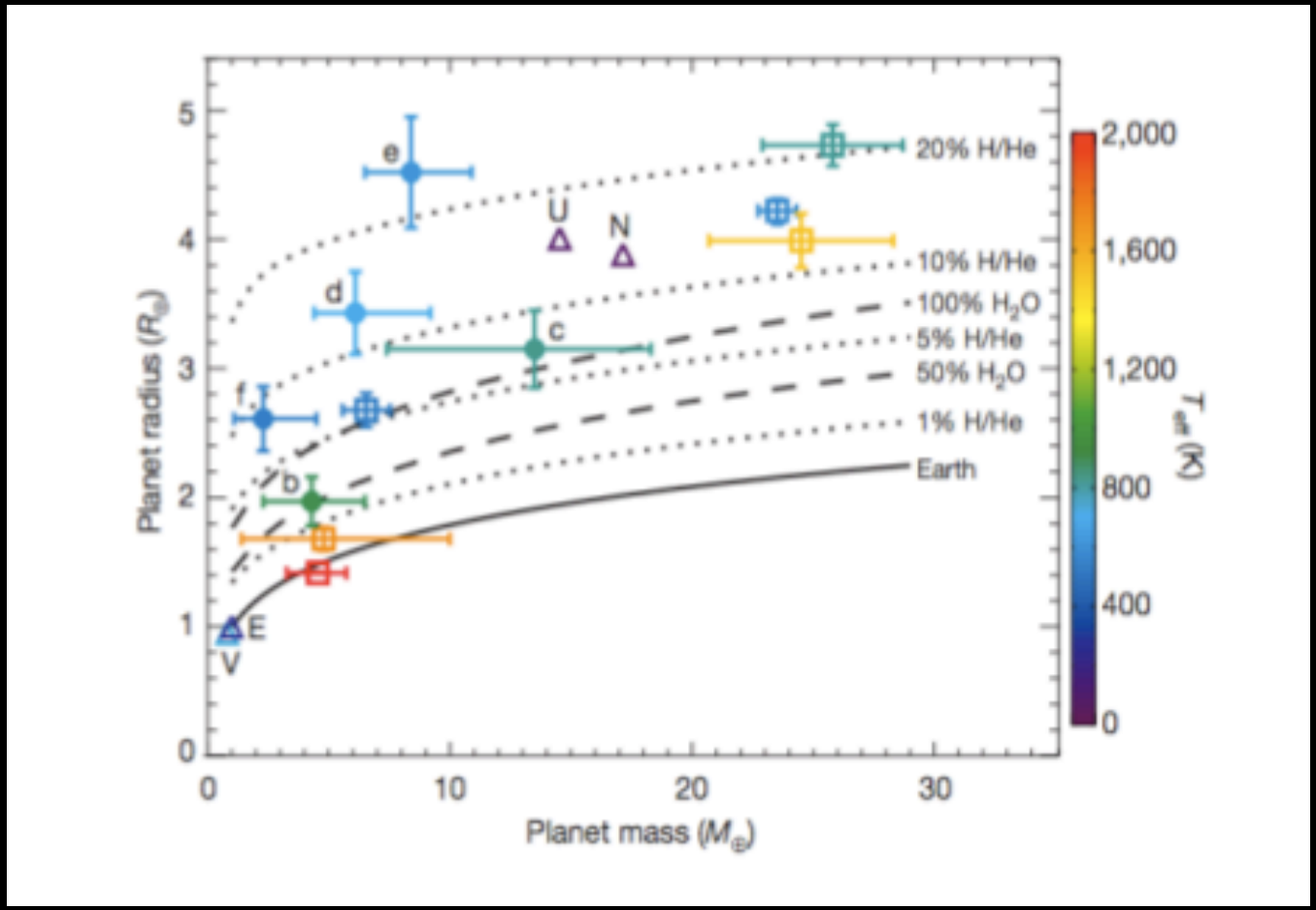
Probing the planet structure



Size and structure needs accuracy

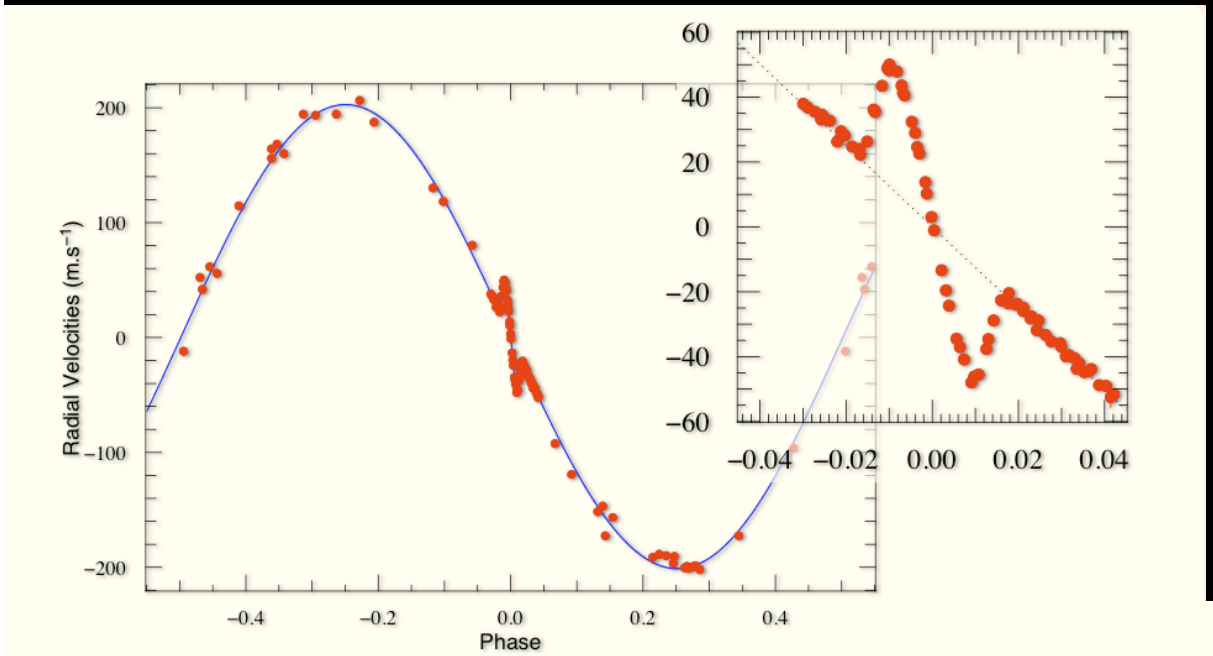


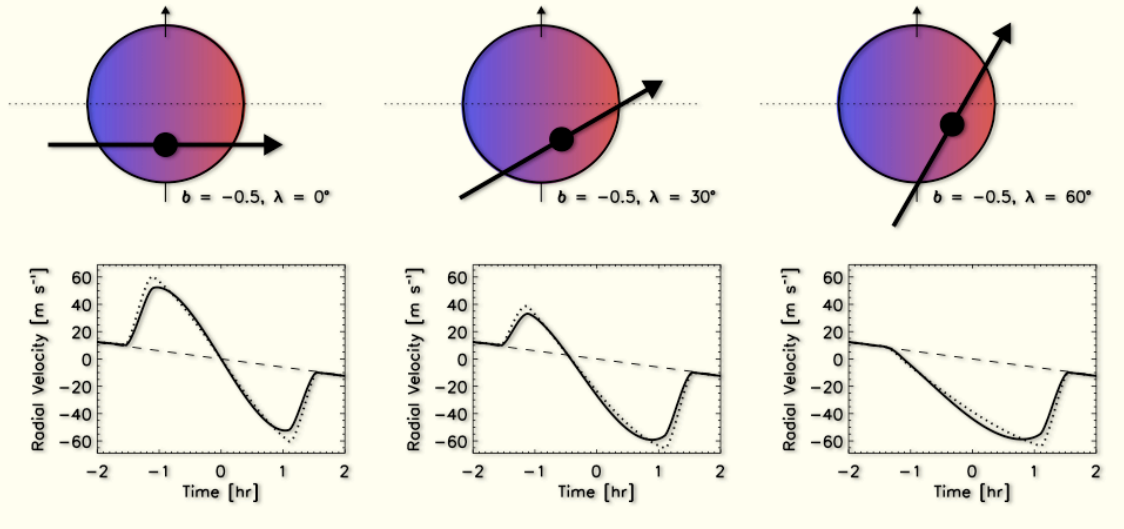
Planets seems to be built on diversity



Lissauer et al 2011

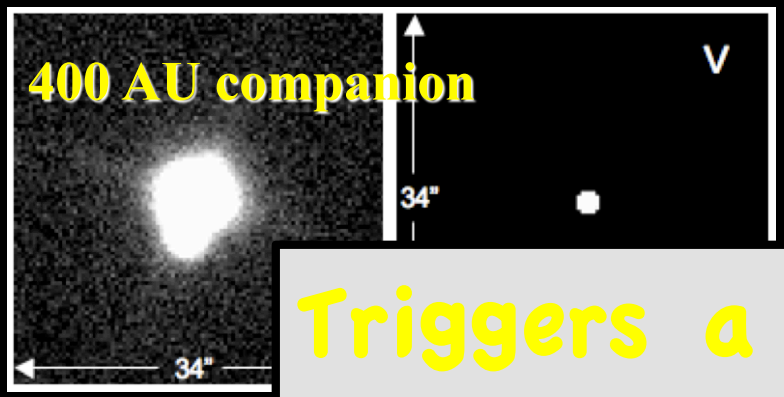
The Rossiter-Mac Laughlin effect

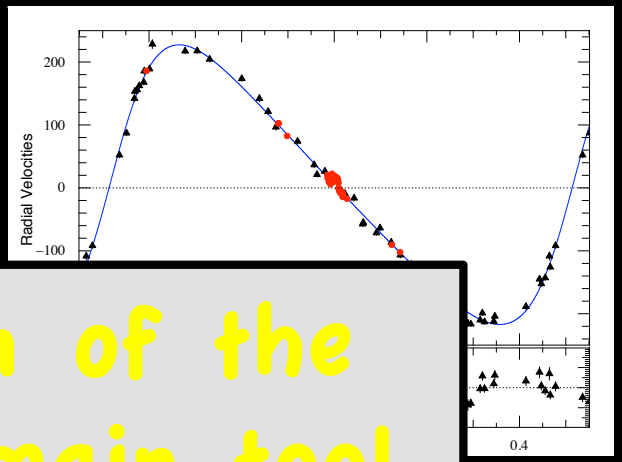




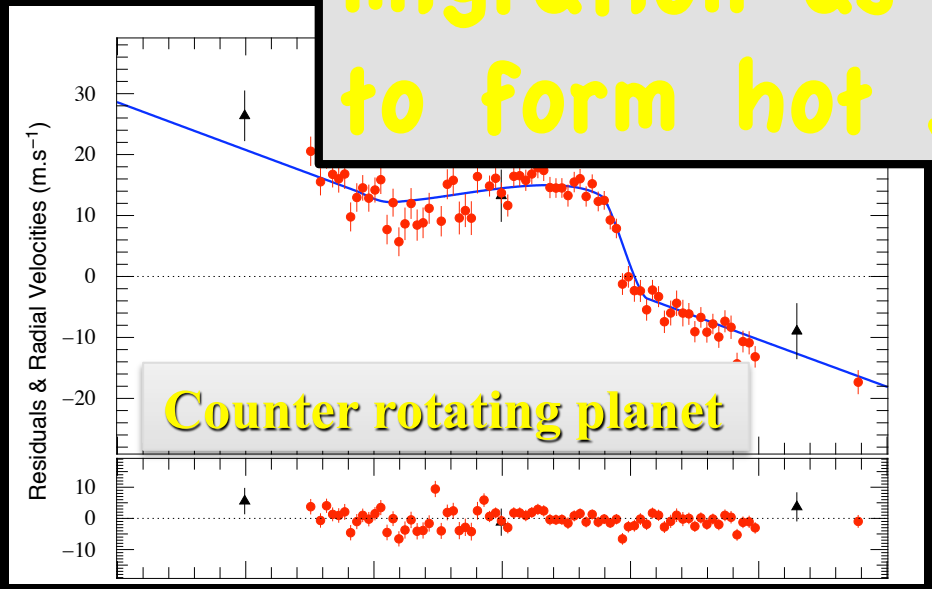
WASP-8 let's rocks

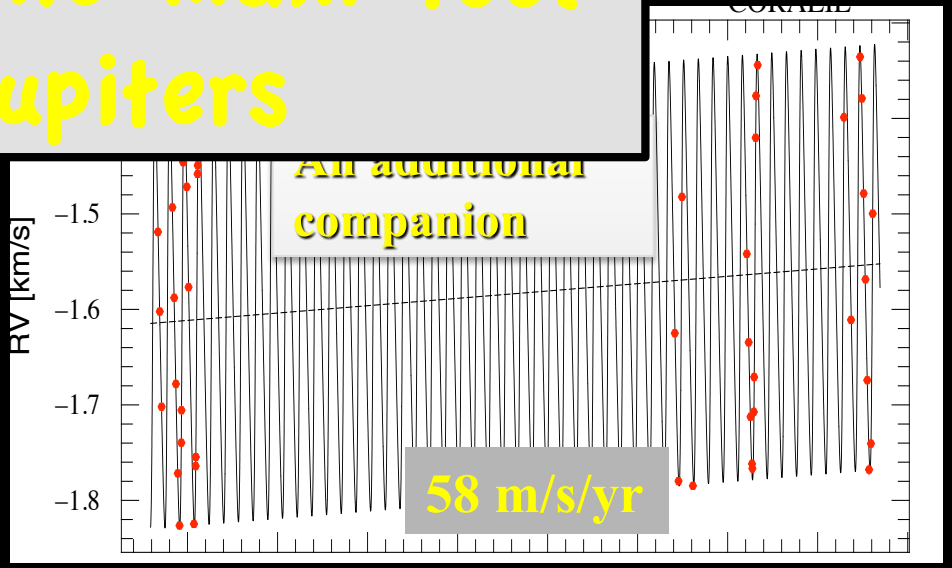
Eccentric P=8d orbit





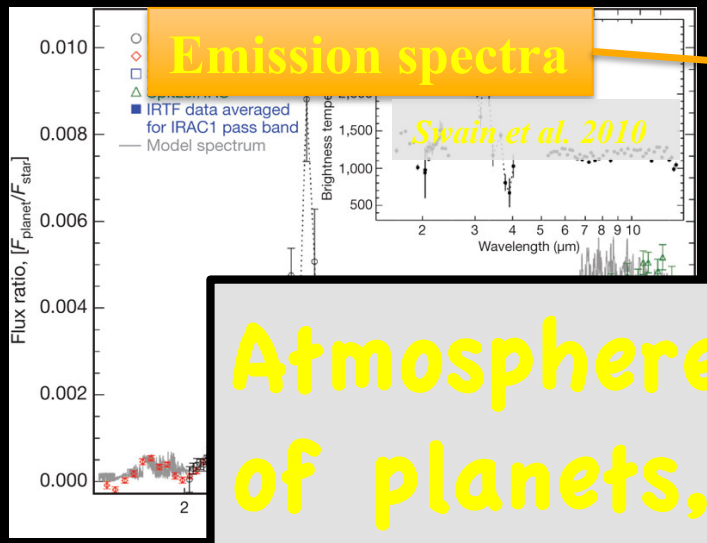
Triggers a revision of the migration as the main tool to form hot Jupiters

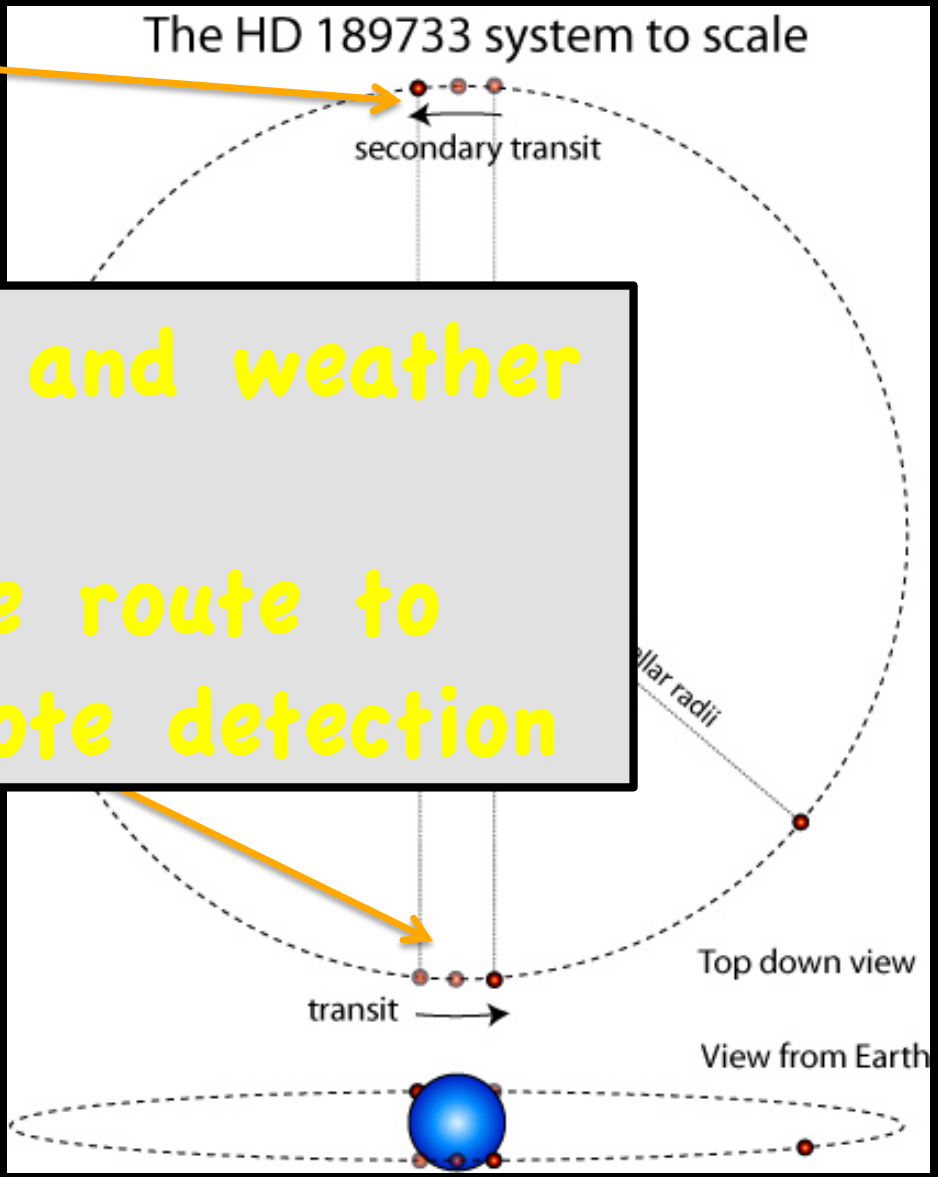




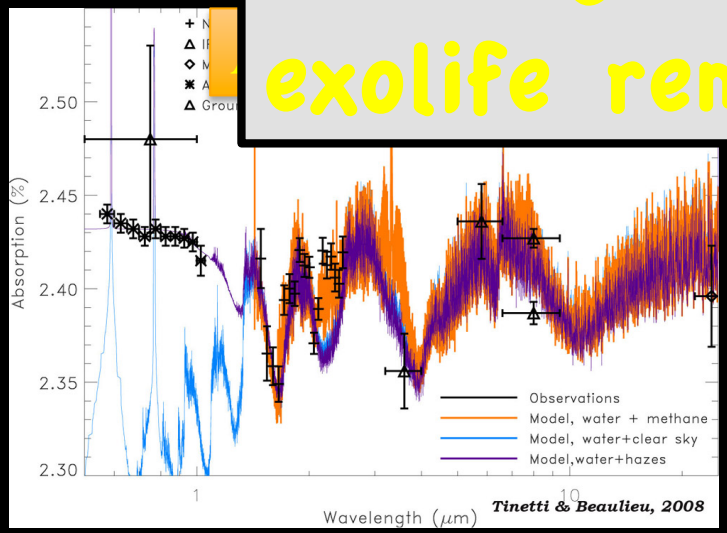
Queloz et al. 2010

Planet spectroscopy

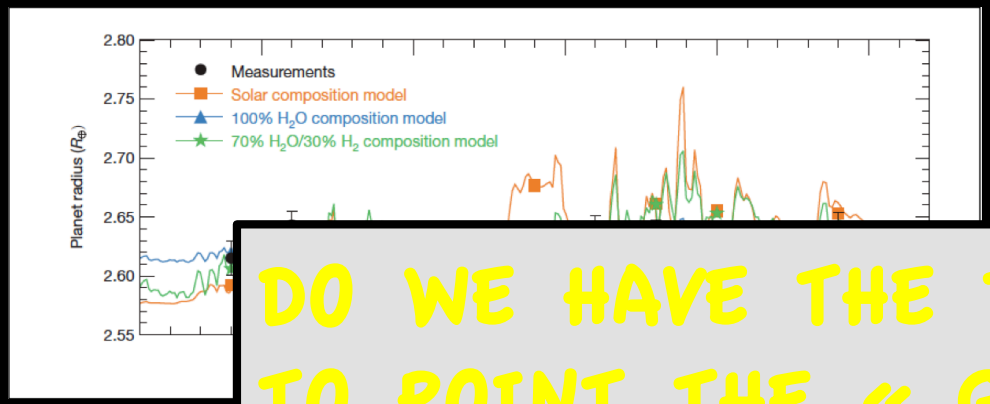




Atmosphere and weather of planets,
… along the route to exolife remote detection

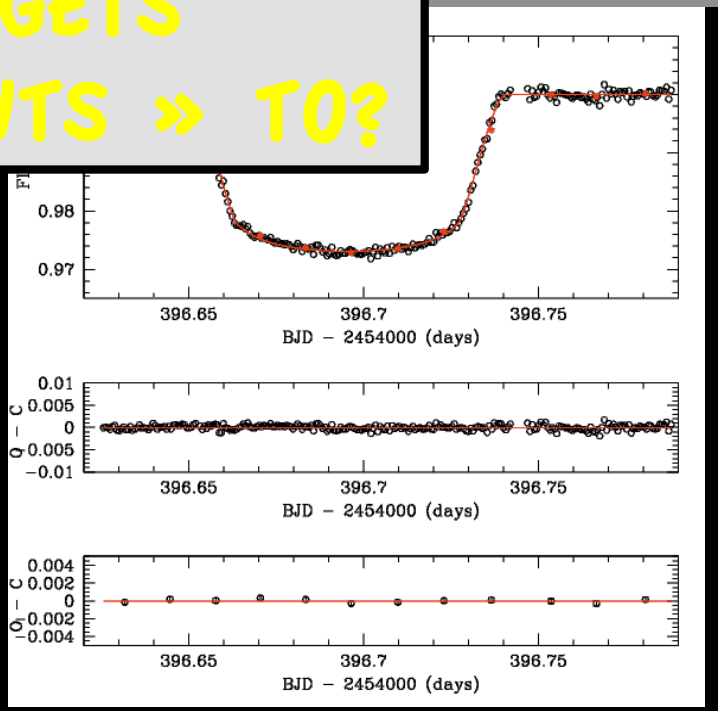


Can be done from the ground



DO WE HAVE THE TARGETS
TO POINT THE « GIANTS » TO?

= 0.00014

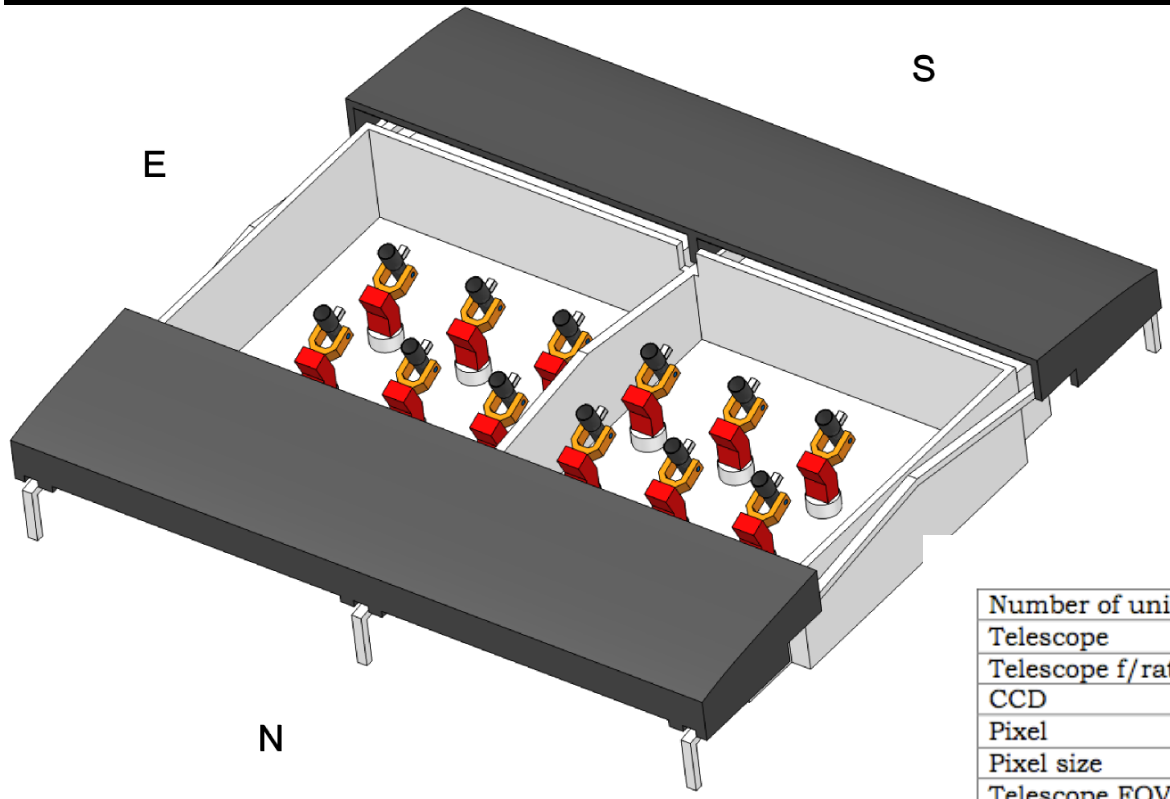


Gillon et al.2011

New Generation Transit Survey

Discover Neptune transiting planets on bright stars

Belfast, DLR Berlin, Geneva, Leicester, Warwick, Catolica

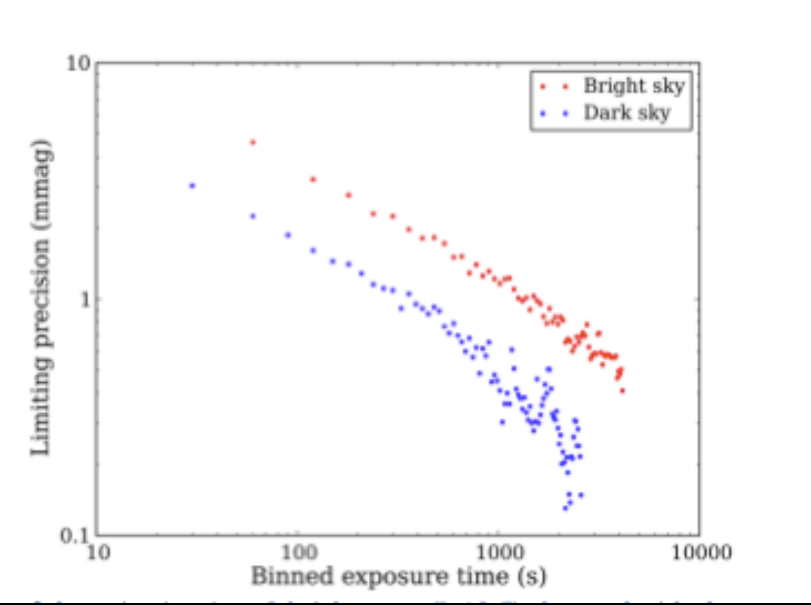


At Paranal
First light 2012
Survey start 2013
Open data policy

Table 2 NGTS system description

Number of unit telescopes	12
Telescope	ASA 8 inch (200mm)
Telescope f/ratio	f/2.8, 560 mm focal length
CCD	e2v 2kx2k DD chip, Ikon-L by Andor
Pixel	13.5 micron
Pixel size	4.97 arcsec
Telescope FOV	8.00 square degrees
Mount type	OMI equatorial fork, 1 per telescope
Building dimension	12m x 15m (including a 3m wide parking)
Pointing limit	Airmass < 2
Total FoV	96 square degrees

Performance design tested in 2010



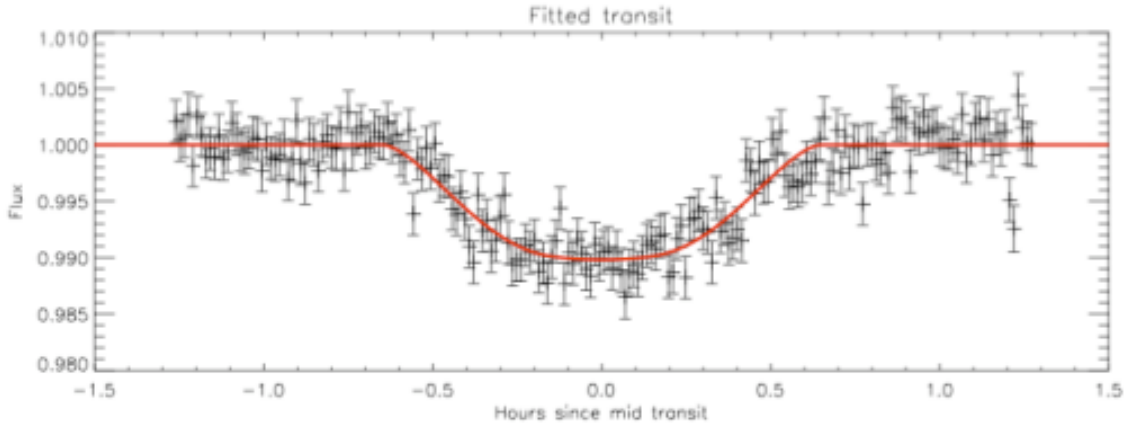
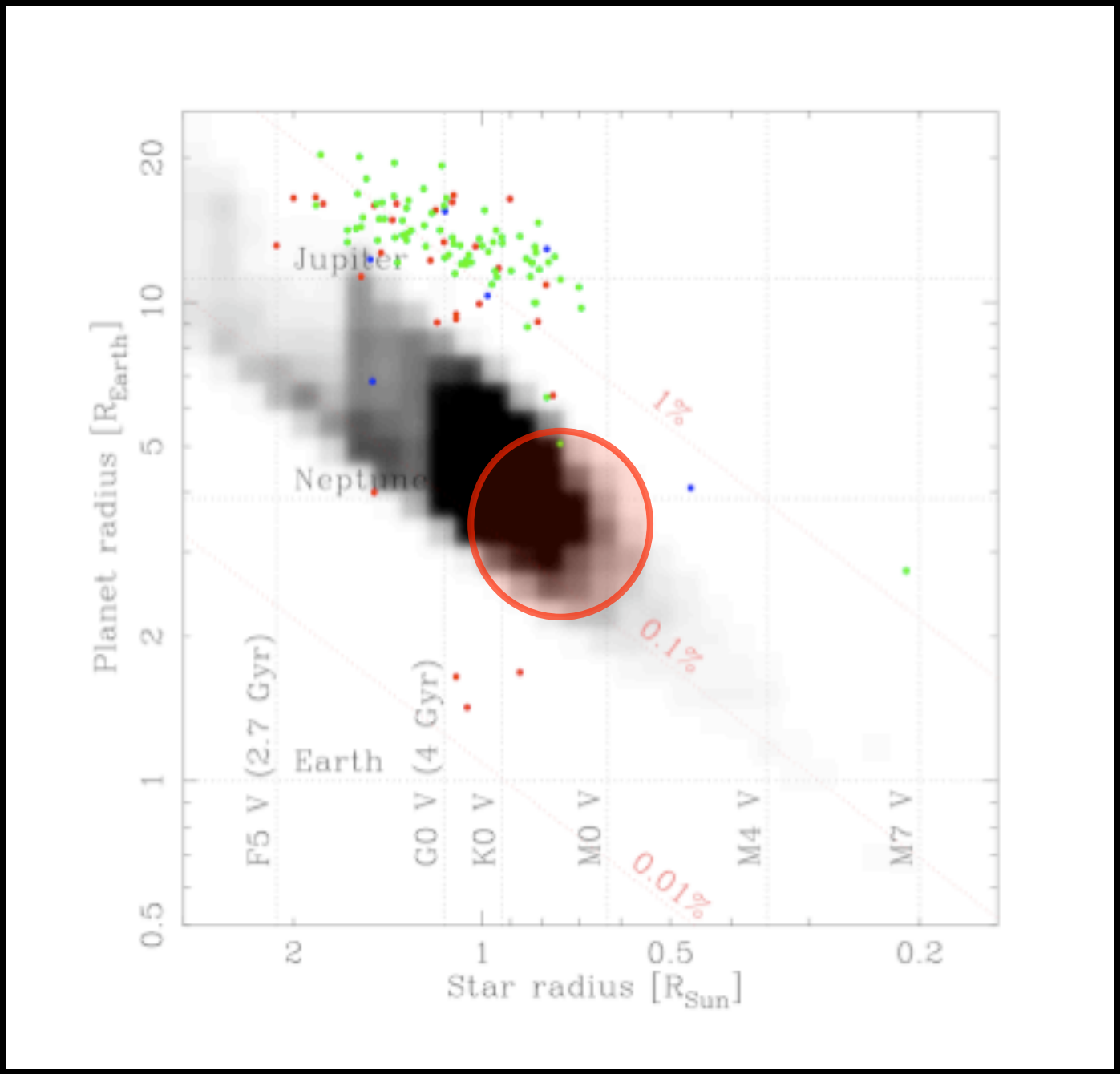


Figure 10 Transit of the hot Neptune orbiting the M star GJ436, observed in 2010 with the NGTS prototype installed at La Palma


Jupiter
Neptune
Earth
1%
0.1%
0.01%
F5 V (2.7 Gyr)
G0 V (4 Gyr)
K0 V
M0 V
M4 V
M7 V
Planet radius [R_Earth]
Star radius [R_Sun]
20
10
5
2
1
0.5
2
1
0.5
0.2

Giants equiped with visible-IR HIGH RESOLUTION SPECTROGRAPH may be fed with transiting planets (ELT: SIMPLE CODEX)

Specificity: BRIGHT targets that requires stable instruments

Goals: structure (rocky planets), atmosphere and weather on planets (Giants and Neptune) on the path for exo-life remote detection