

# Terra Hunting Experiment

## HARPS-3 @ INT

Cambridge , Exeter, NOVA, IAC, Stockholm, Geneva,  
U. Queen Belfast, Oxford, Princeton, Flatiron

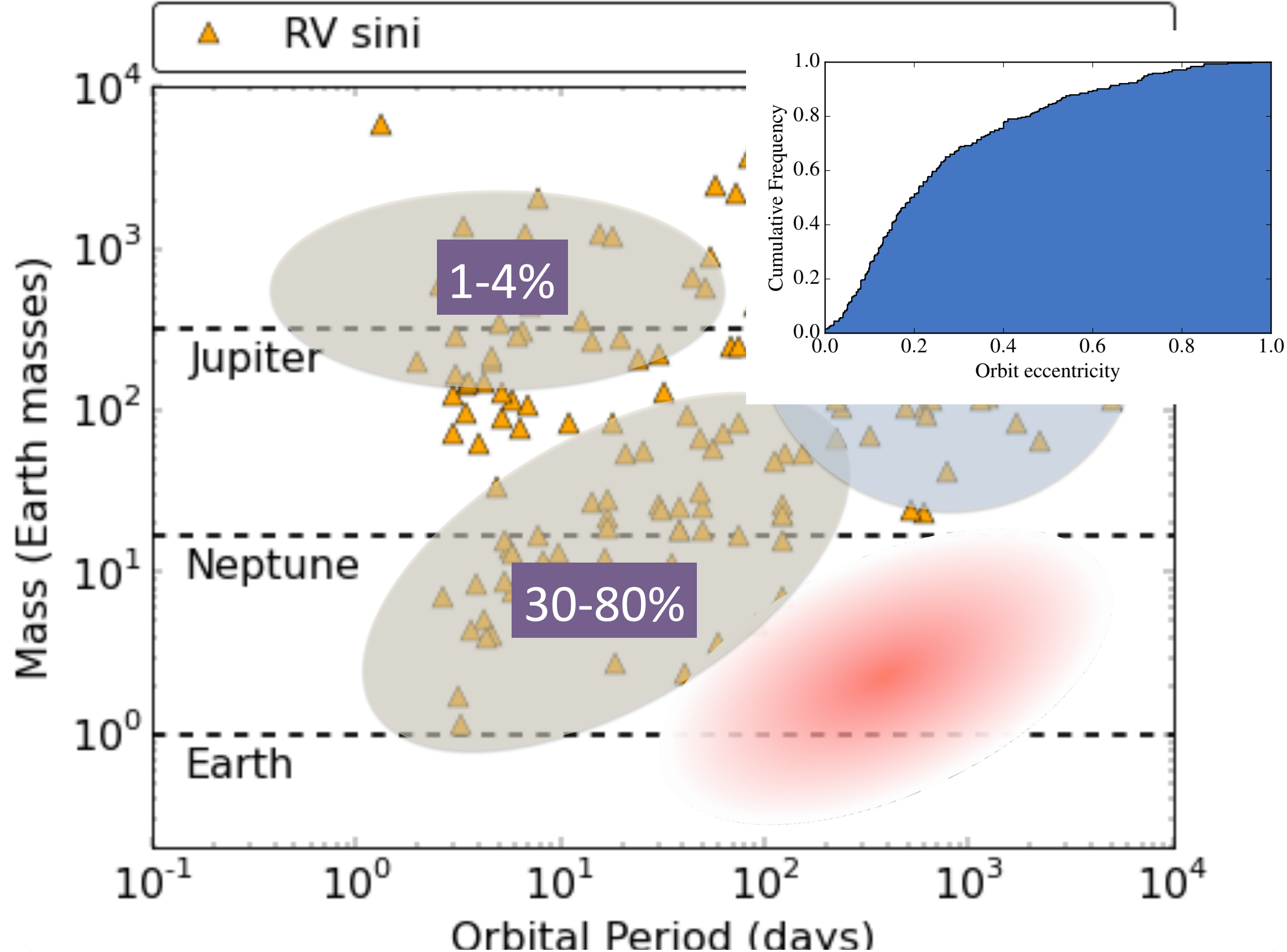
- **How diverse are planetary systems ?**

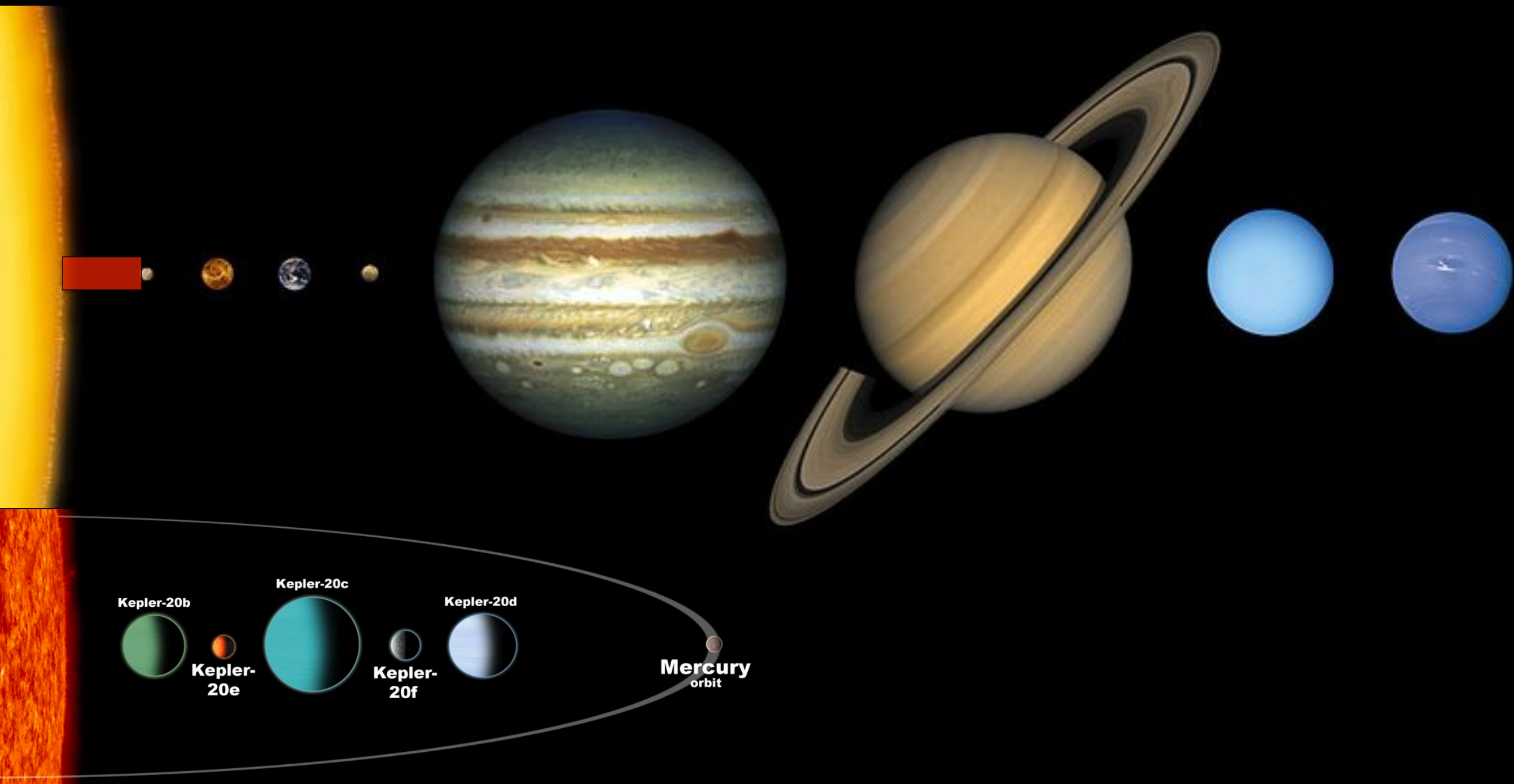
*Our Solar system in perspectives*

*Towards an universal model for planetary systems*

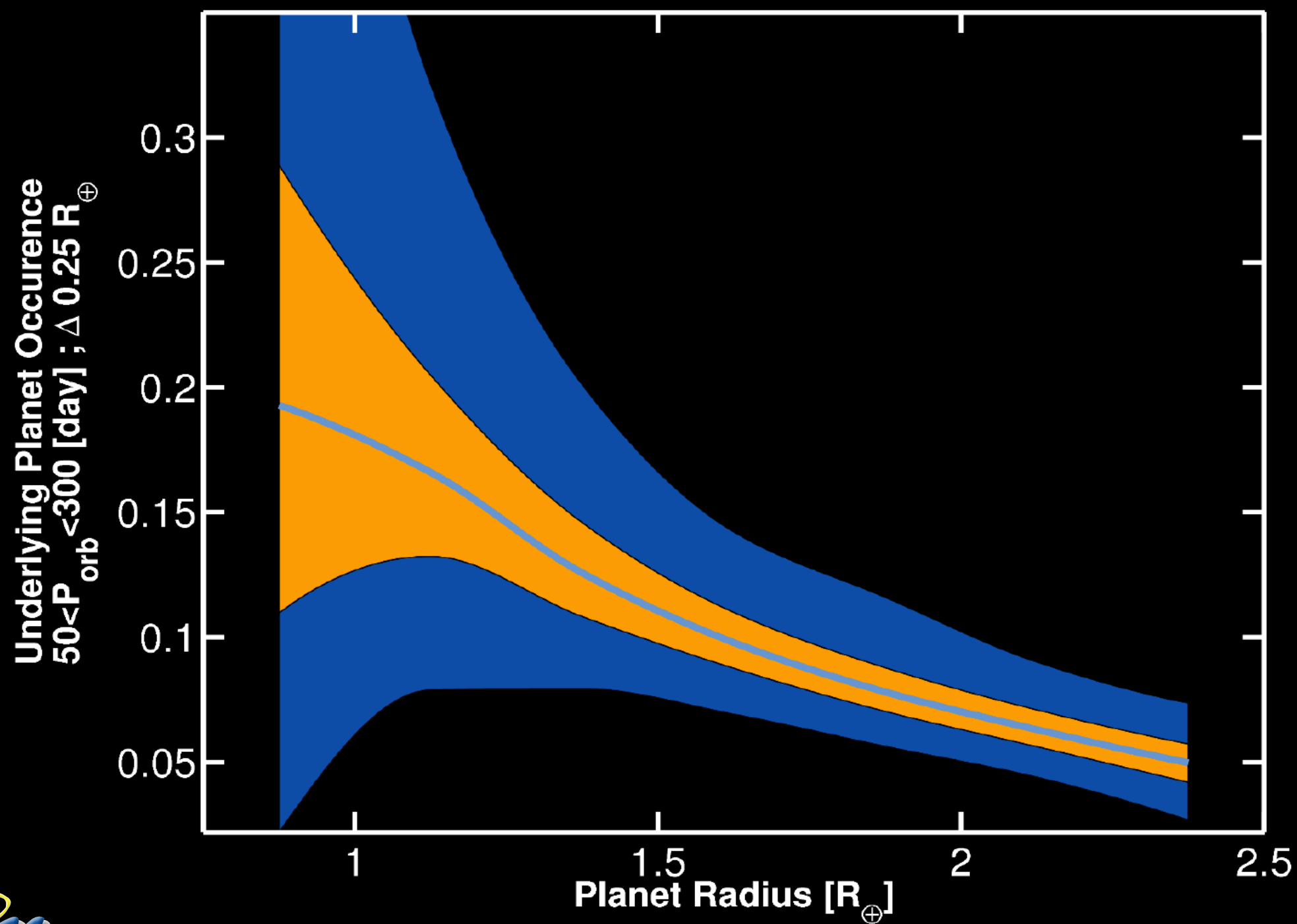
- **Is there life elsewhere ?**

*Understanding the origin, prevalence and nature of life  
in the Universe.*

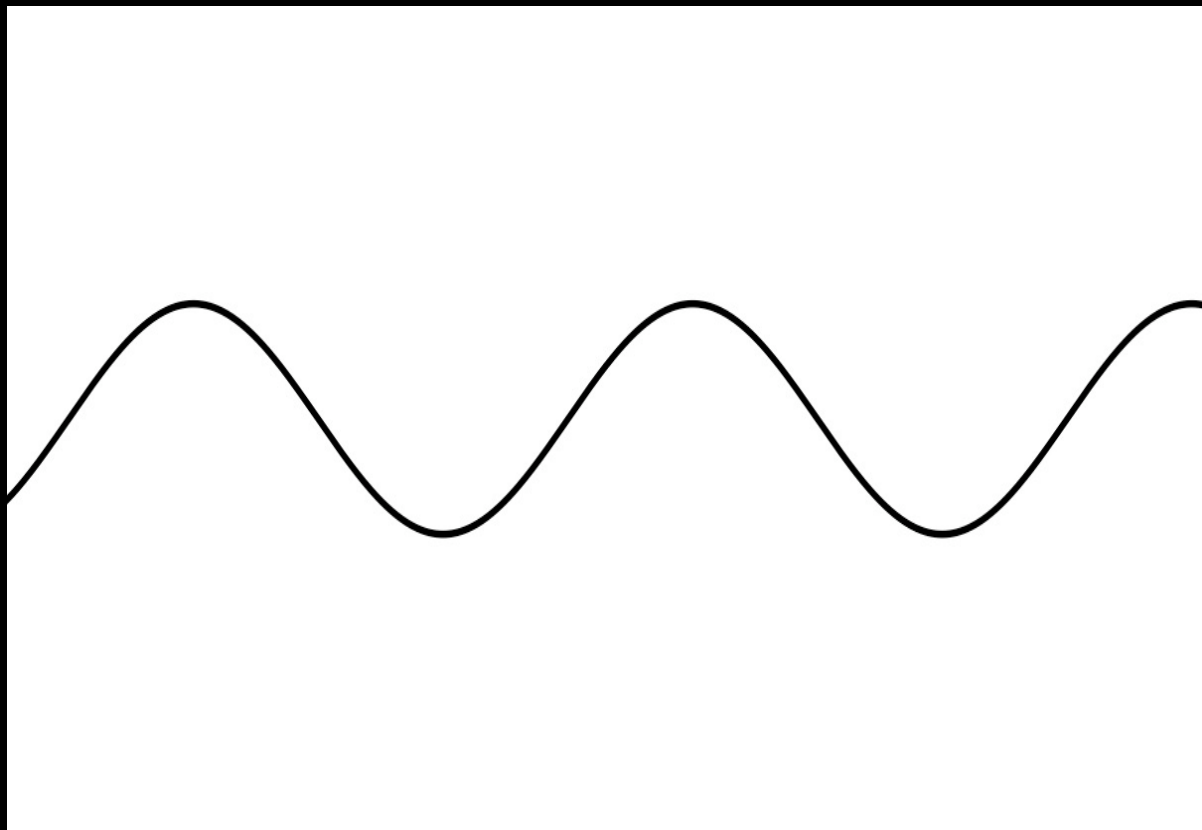




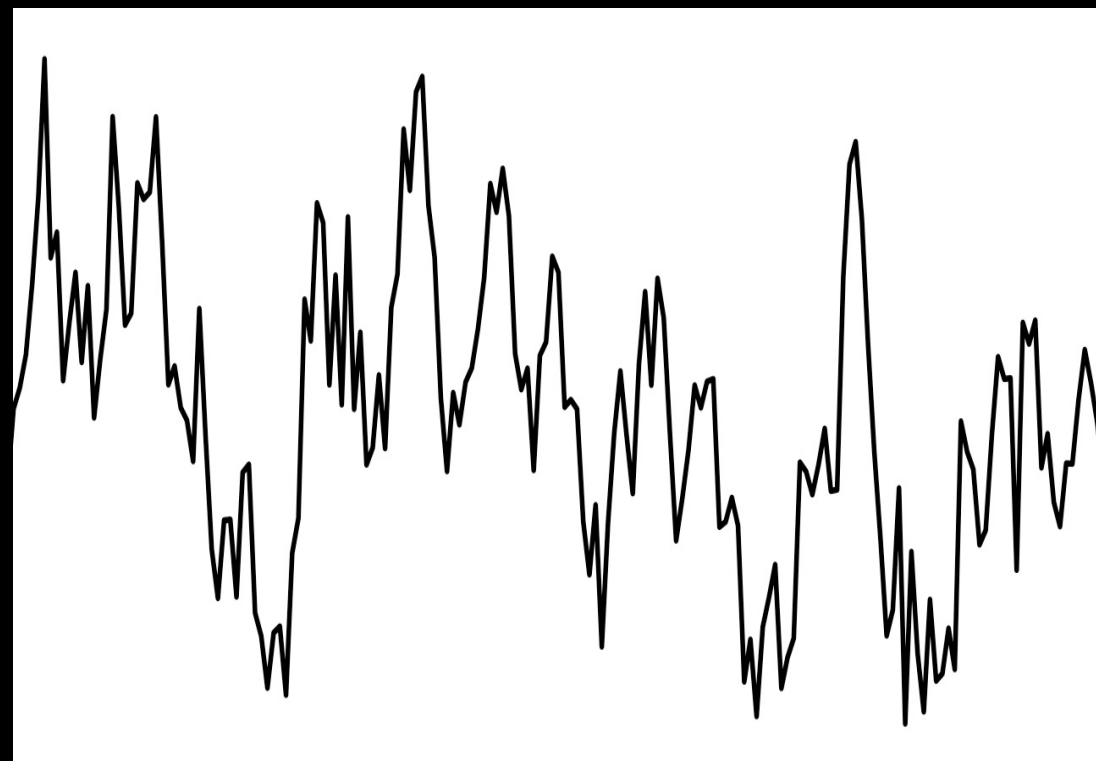
# Kepler, Eta Earth measurement...



Courtesy Batalha

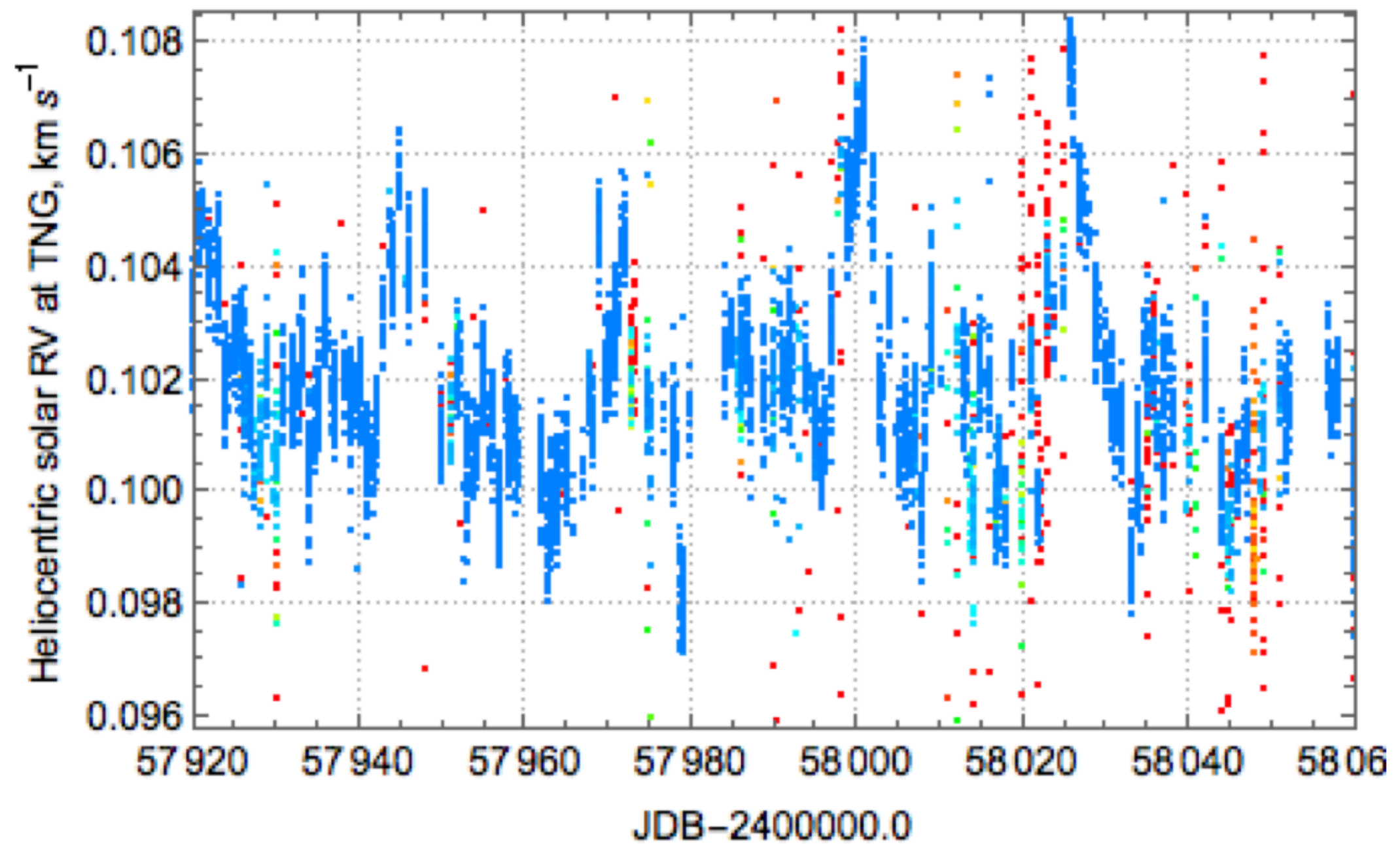


Planet RV



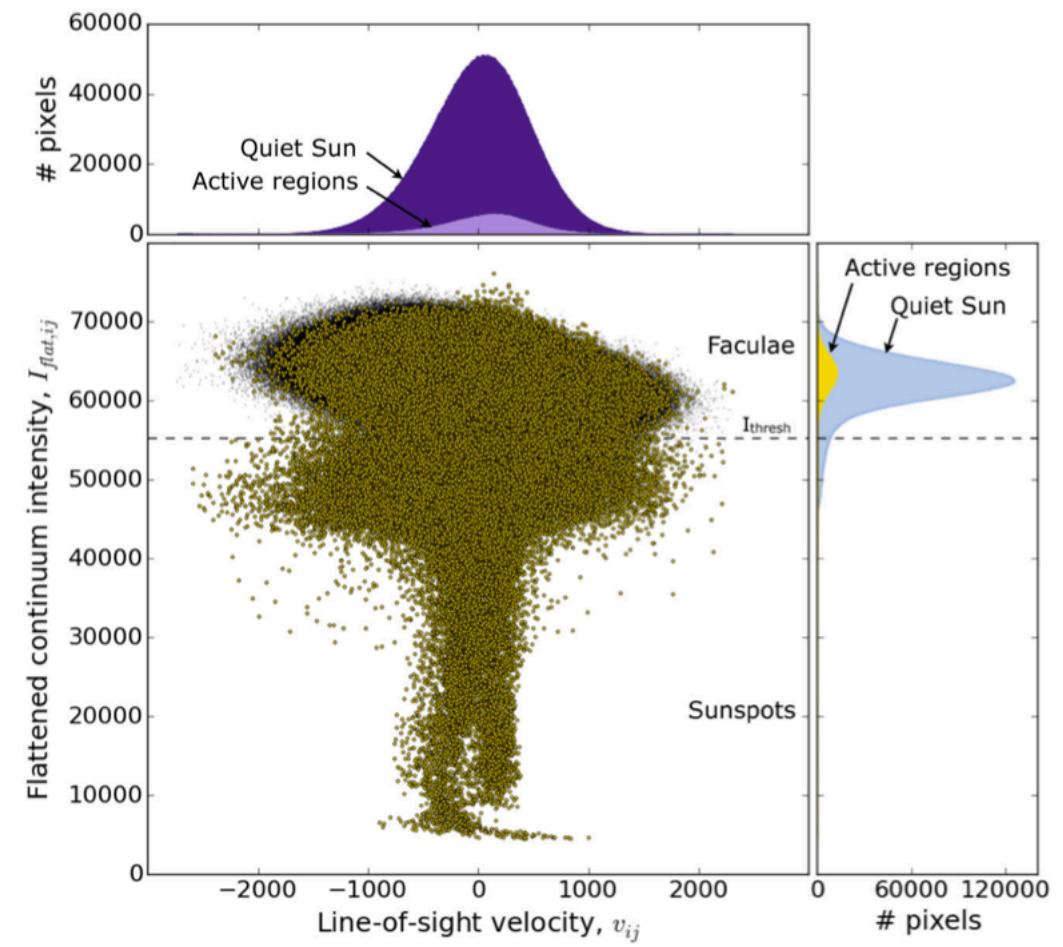
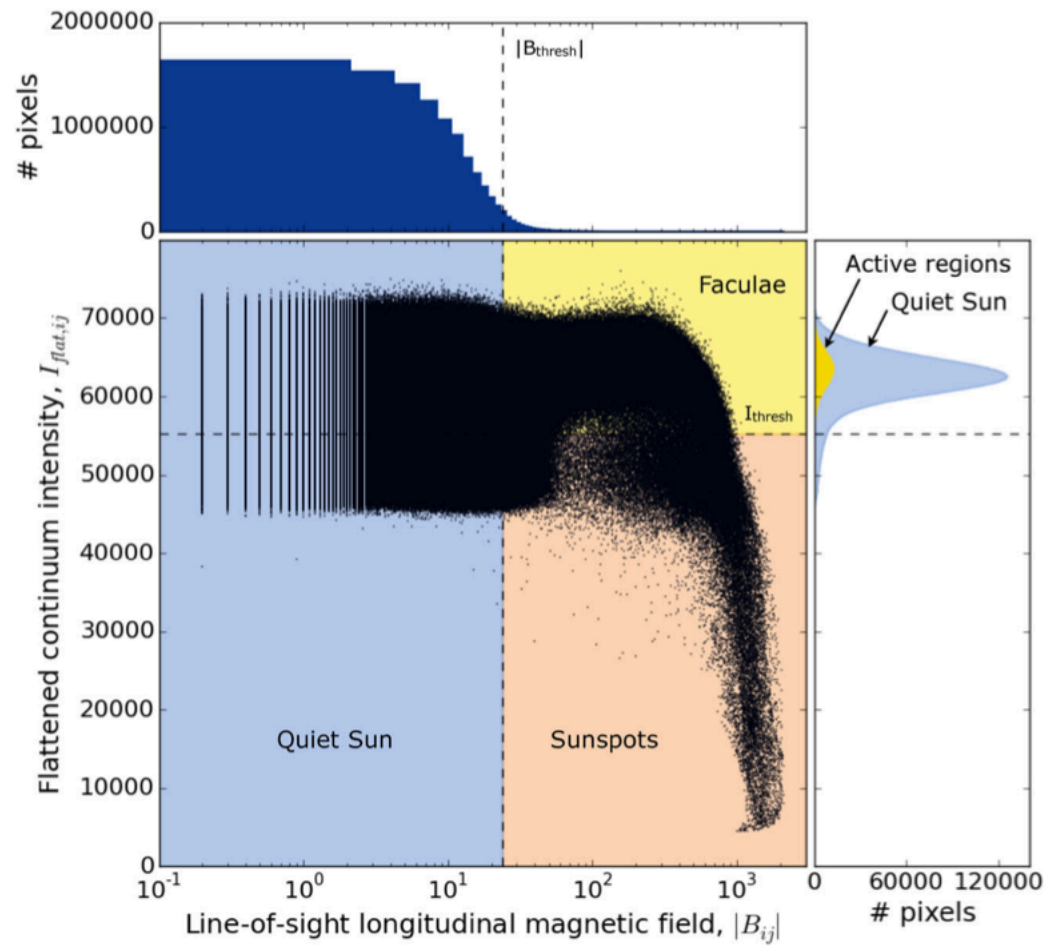
Stellar RV

# HARPS-N solar telescope

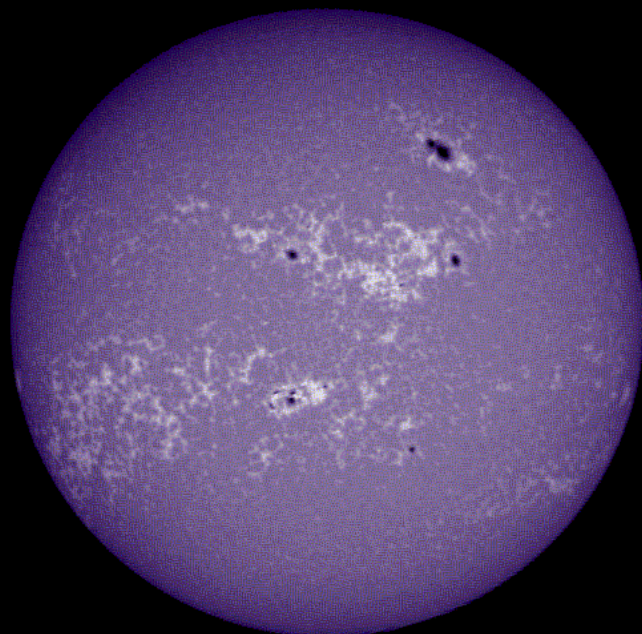


Cameron et al. 2019

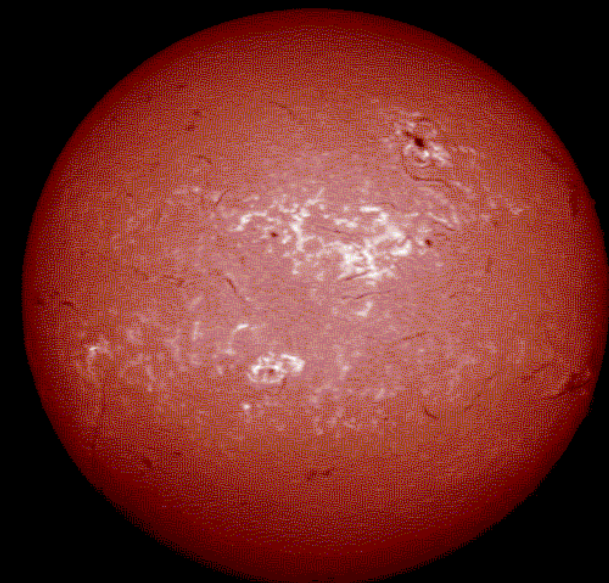




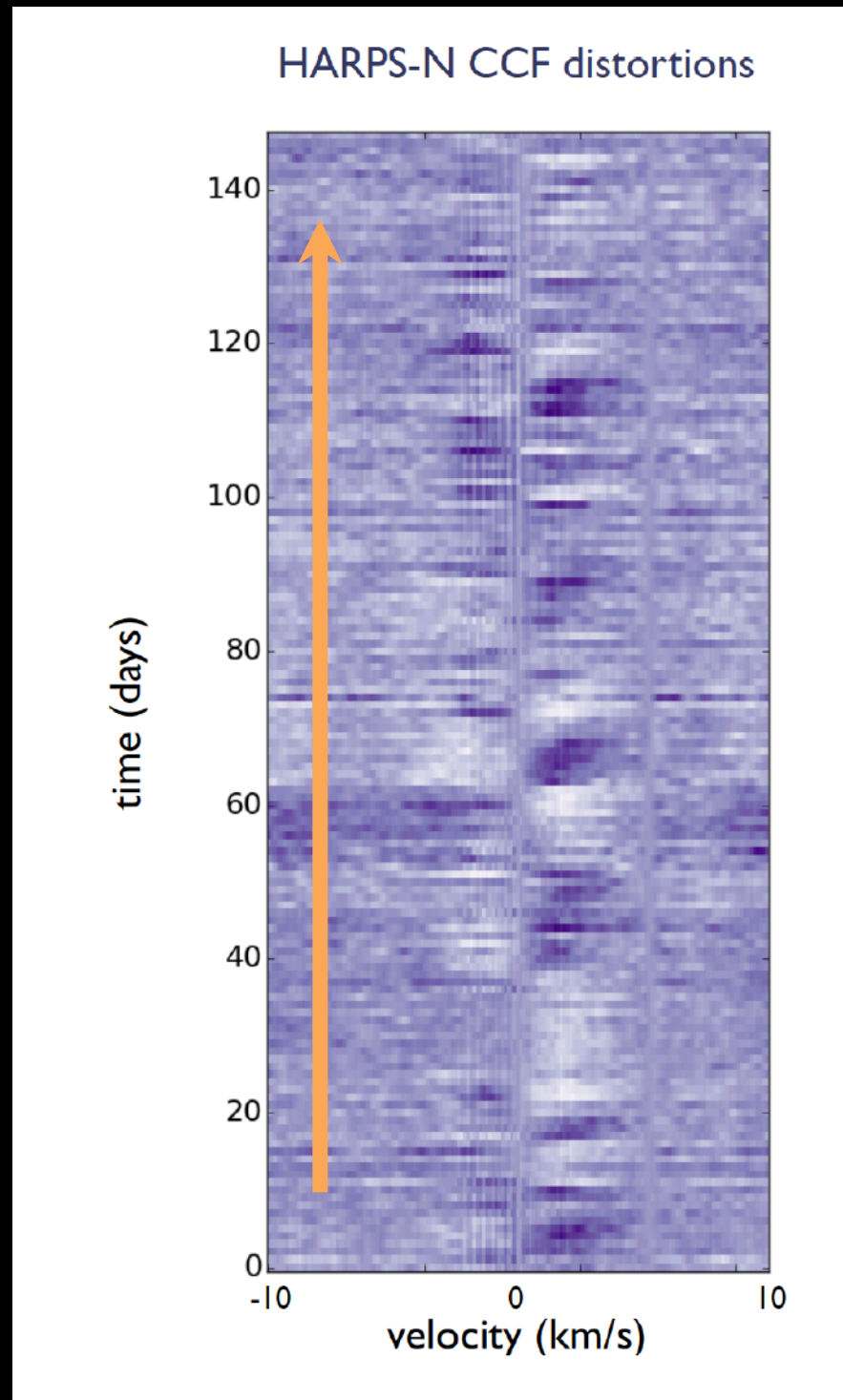
Ca II 3934 Å  
BBSO



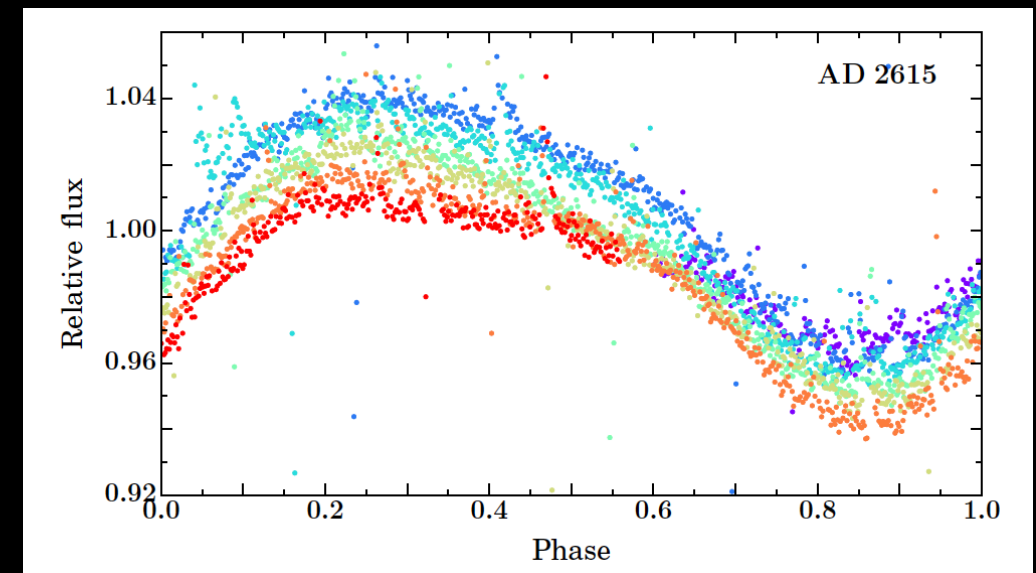
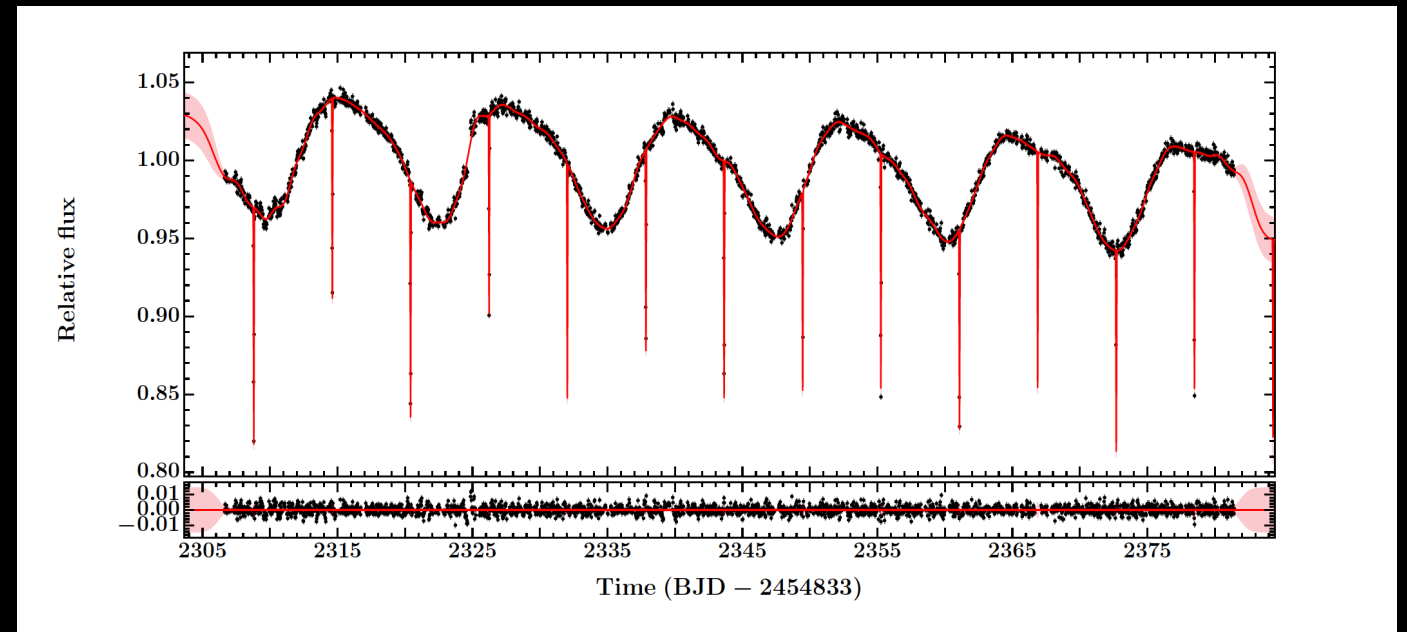
H I 6563 Å  
BBSO



# Our Sun as a star



# A eclipsing binary star in Praesepe



*Gillen et al 2017*

*Haywood et al 2018*



## Science Goal:

Detecting 1-4 Earth mass, with period from 50d to 300d on star brighter than 8.5<sup>th</sup> (RV amplitude 10-100cm/s)

## Accuracy Requirements:

- 48 hours calibration <10 cm/s (differential reference)
- Yearly “systematics” 20 cm/s (absolute reference)
- 30 cm/s photon noise per RV measurements ( $SN_{r.e.}=300$ )

## Survey model

(essentially based on R. Hall et al. 2019)

- Season Long uninterrupted “weather permit” nightly series of RV
- (never less than 4h/night, every day\*)
- Season is between 6-9 months
- 150 RV/year x (up to 10 years)
- Stellar jitter “residual pink noise ” less than 1m/s (peak-to-peak)

\* Excl. Eng. nights

# Uninterrupted nightly series is ING magic wand!

