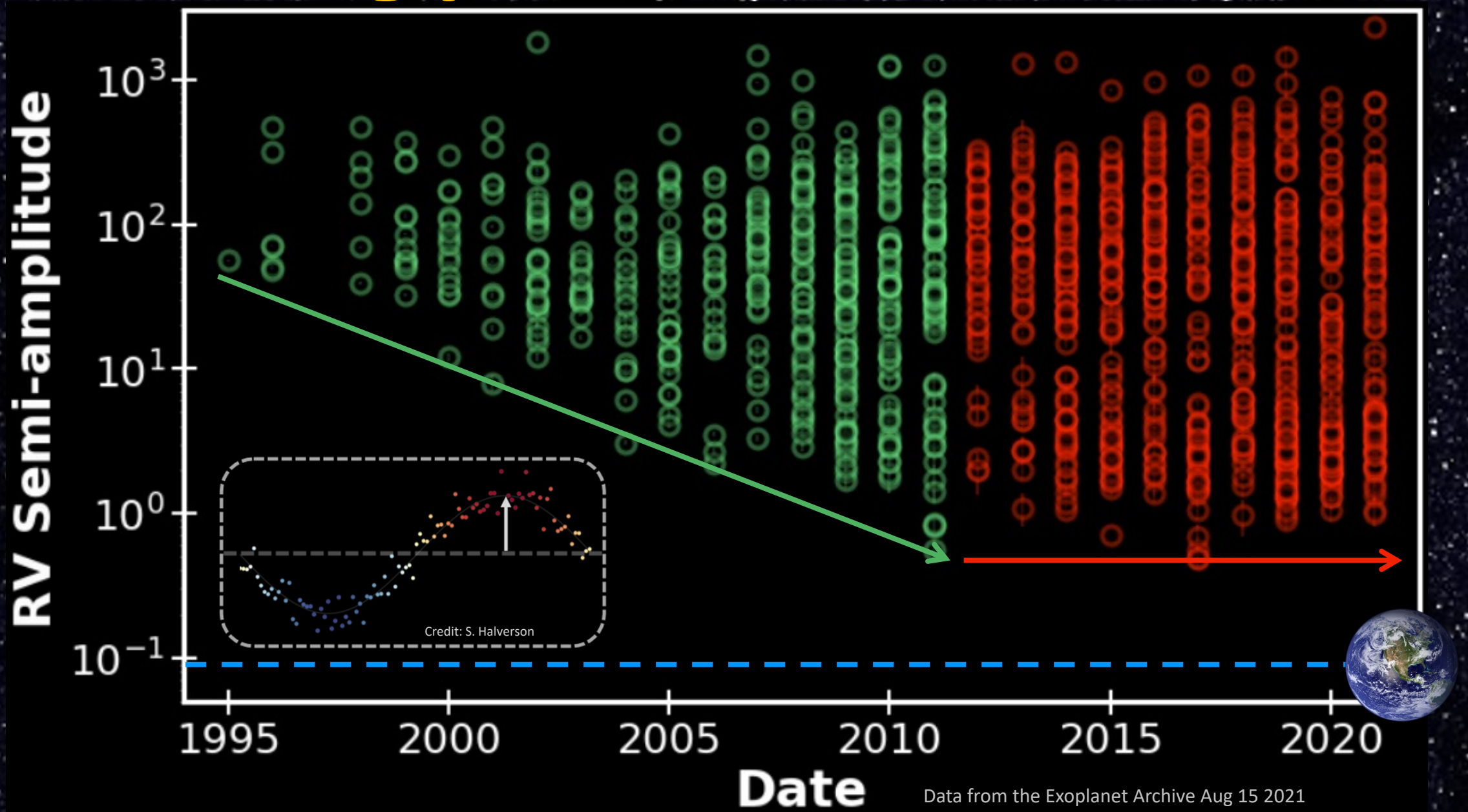


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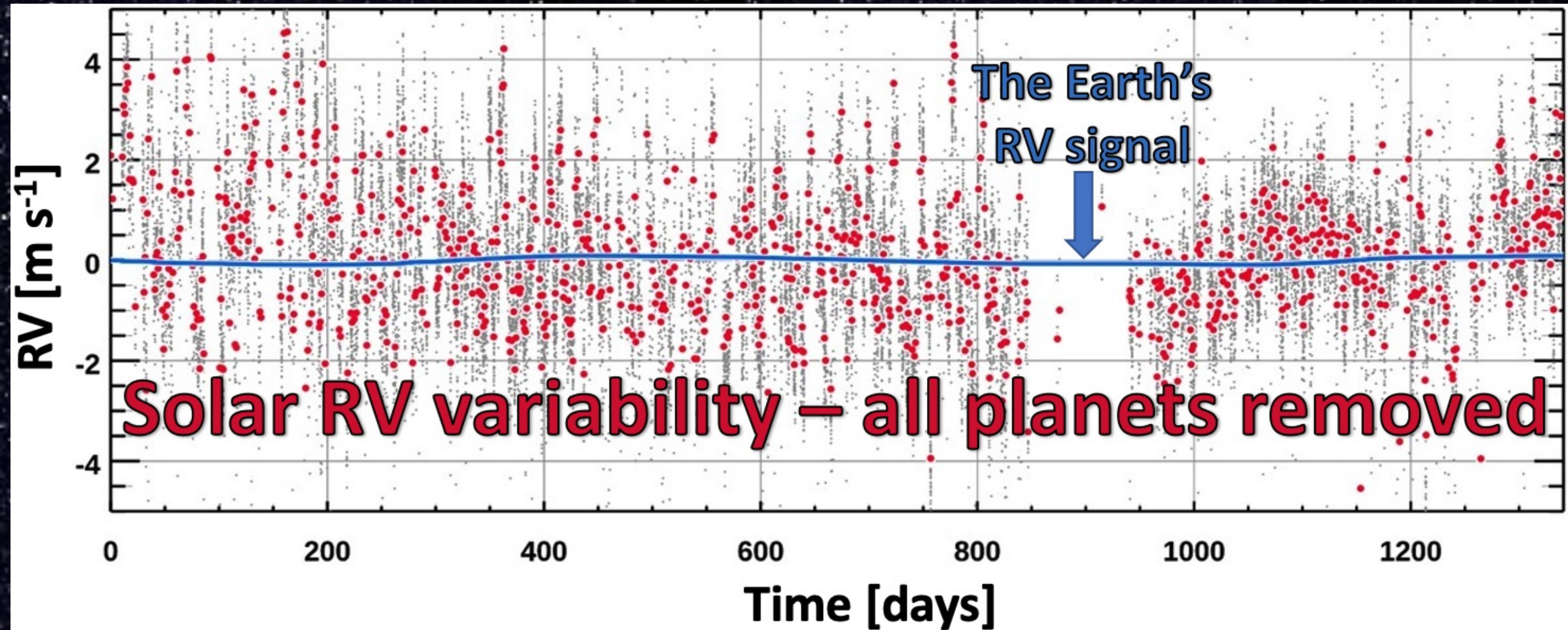
Jennifer Burt -- JPL / ExEP
jennifer.burt@jpl.nasa.gov

CL#23-1306

Detecting planets $<1 \text{ m s}^{-1}$ is HARD

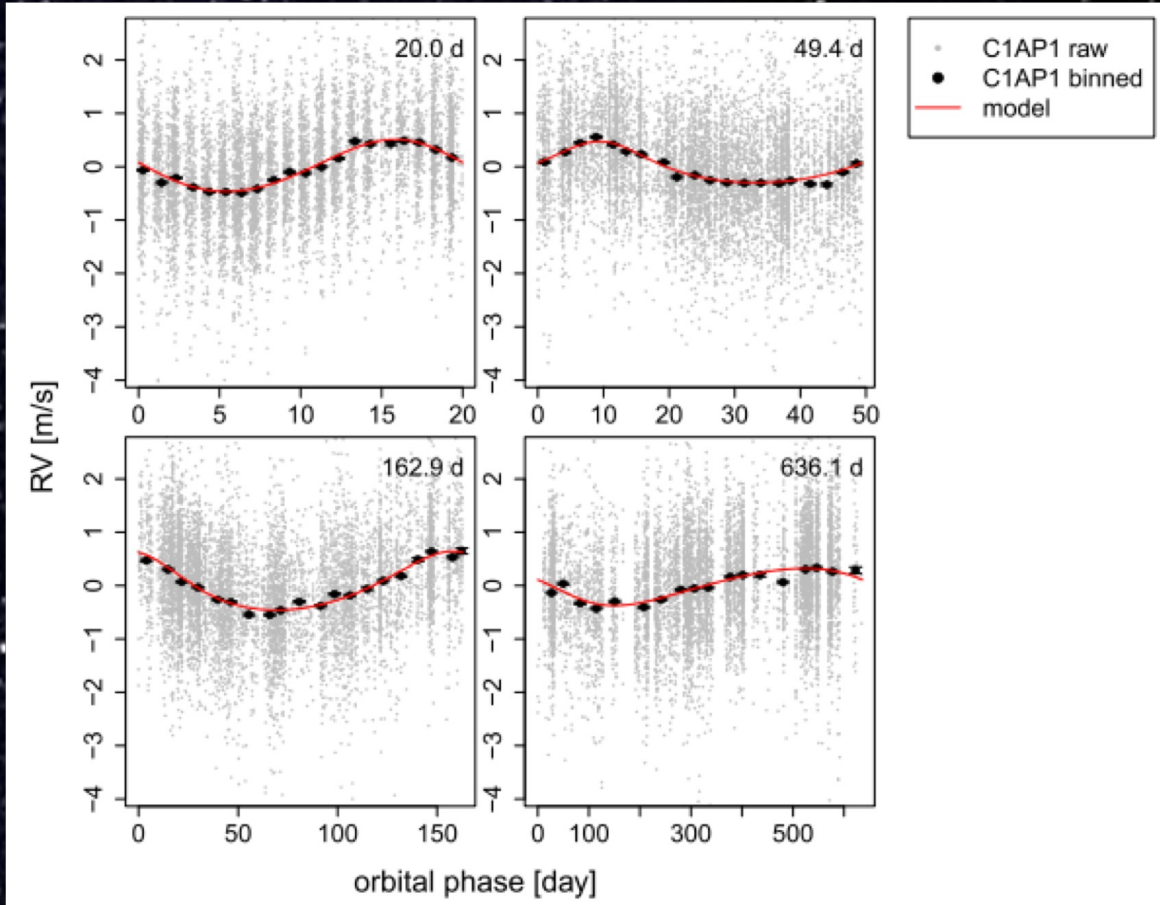


Detecting planets $< 1 \text{ m s}^{-1}$ is HARD

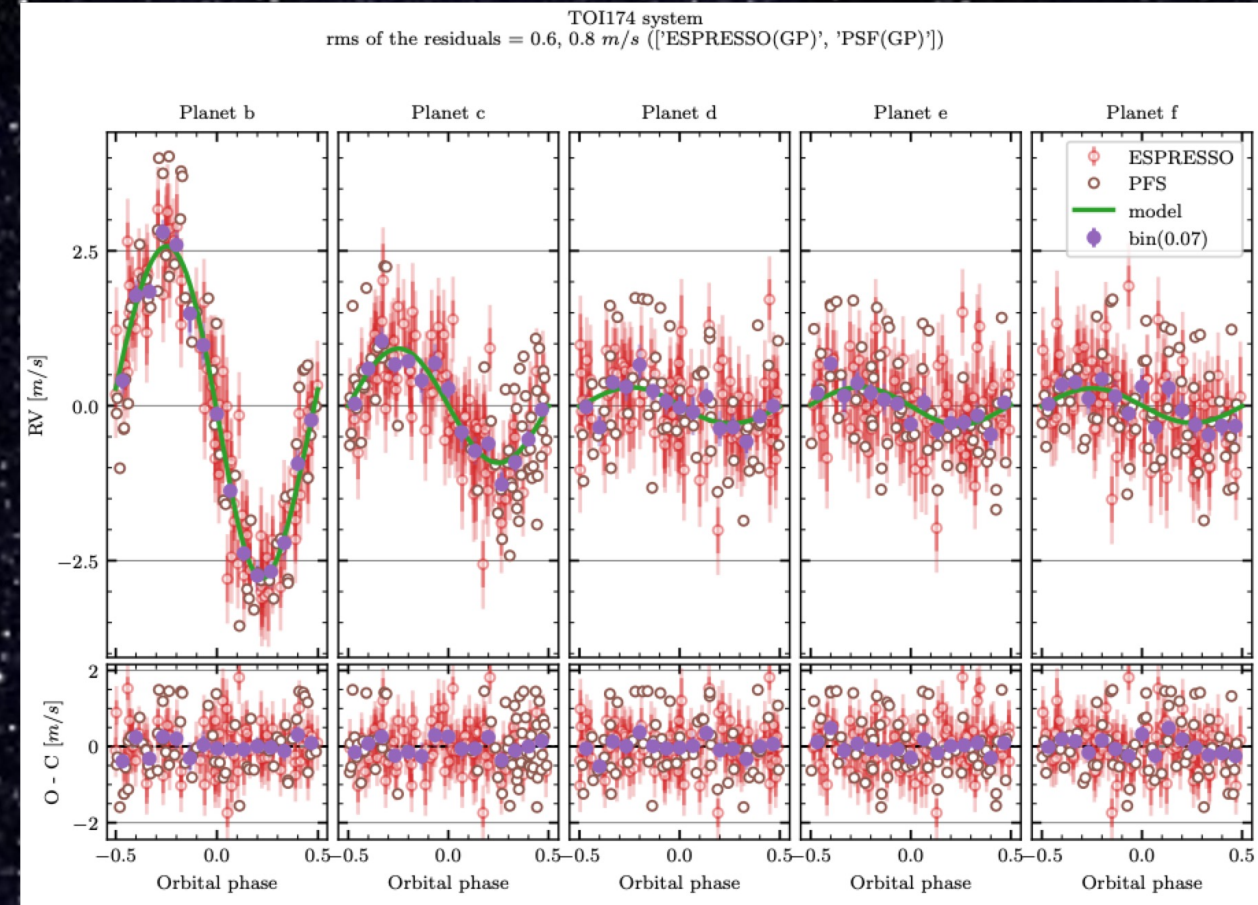


Lowest K detections to date

Feng et al. 2017



Barros et al. 2022



Planet f : $K = 0.35^{+0.10/-0.12}$; $M = 3.93^{+1.05/-1.37} M_{\oplus}$

Planet h : $K = 0.39^{+0.15/-0.06}$; $M = 1.83^{+0.68/-0.26} M_{\oplus}$

Planet d : $K = 0.29 \pm 0.11$ m/s ; $0.55^{+0.21/-0.20} M_{\oplus}$

Planet e : $K = 0.30^{+0.10/-0.12}$ m/s ; $0.72^{+0.28/-0.27} M_{\oplus}$

Planet f : $K = 0.29 \pm 0.11$ m/s , $M = 0.77^{+0.44/-0.40} M_{\oplus}$

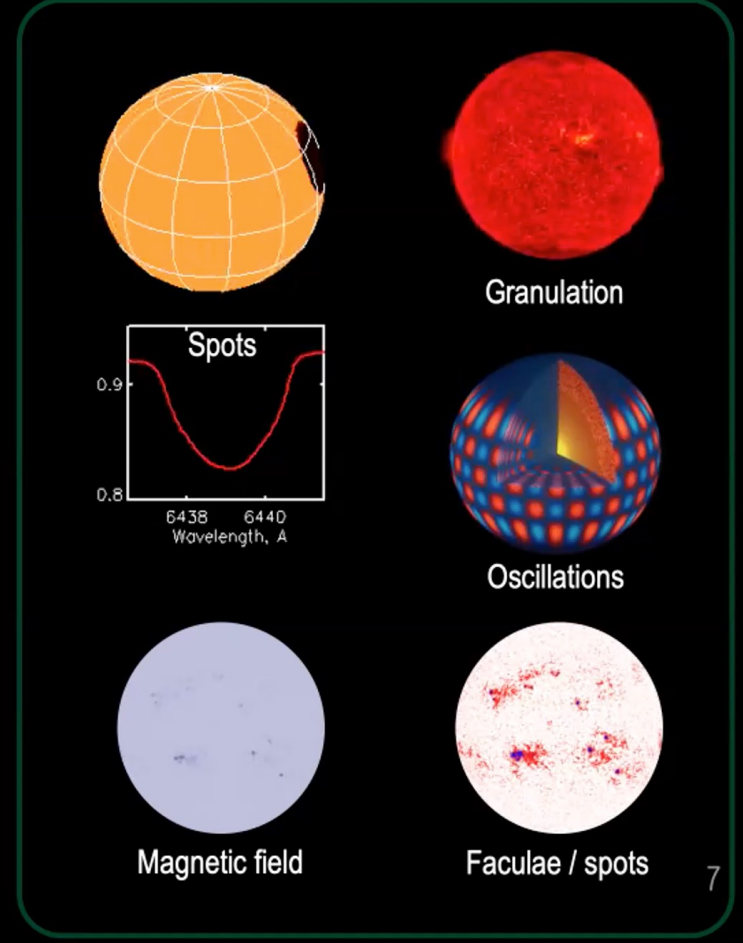
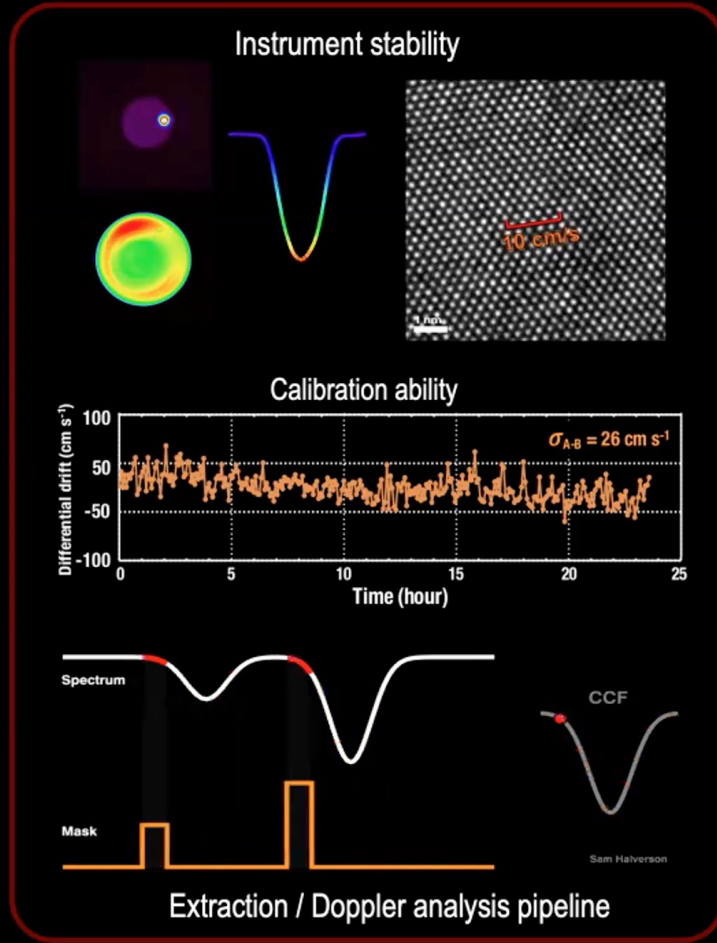
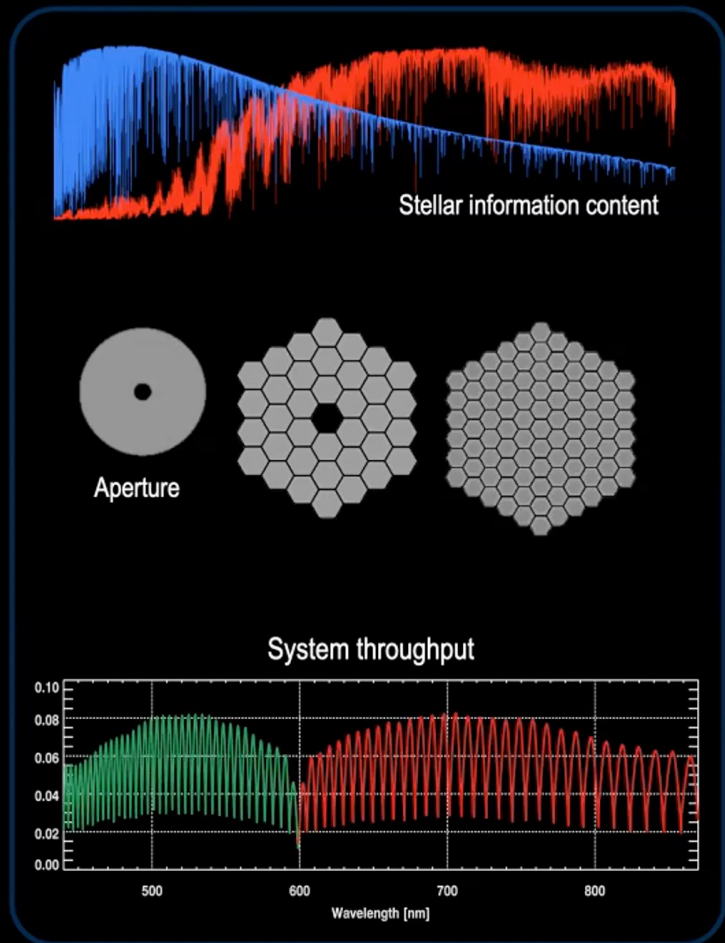
Many aspects of RV precision

σ_{RV}

σ_{photon}

σ_{facility}

σ_{star}



The EPRV Research Coordination Network

EPRV RCN Core Objectives:

- To further our joint strategic objective to discover and characterize Earth-mass exoplanets around Sun-like stars using extreme precision radial velocities
- To foster a community of collaboration, information exchange, and mentorship
- To establish a mechanism to break down the barriers between agencies, divisions and discipline-specific research communities

To join: <https://exoplanets.nasa.gov/exep/NNExplore/EPRV-RCN>

The EPRV RCN


Current Activities:

- Monthly EPRV colloquia
- Splinter sessions at conferences [ExoIV, EPRV 5]
- Semesterly full RCN meetings
- Topical meetings [Laser Frequency Combs - Jan 19th]
- Working Groups [RV standard stars starting up now]



EPRV Colloquium Series:
May 26th 2022, 10a PT / 1p ET / 6p UK
Speaker: Dr. Lily Zhao
*"The EXPRES Stellar-Signals Project:
Establishing the State of the Field in
Disentangling Photospheric Velocities"*

Presented by the
EPRV Research Coordination Network




EPRV Colloquium Series: August 25th 2022
8a PT / 11a ET / 4p UK / 5p Geneva
Speaker: Michaël Crétignier
*"Line-by-line RVs: A promising solution
to the EPRV problem"*

Presented by the
EPRV Research Coordination Network




EPRV Colloquium Series: June 23rd 2022
10a PT / 1p ET / 6p UK
Speaker: Dr. Suzanne Aigrain
*"Towards other earths by way of young
Neptunes: data driven stellar variability
models for radial velocity planet searches"*

Presented by the
EPRV Research Coordination Network




EPRV Colloquium Series
Oct 27th 2022, 8a PT / 11a ET / 4p UK
Speaker: Annelies Mortier
*"Observing the Sun to learn
about the stars"*

Presented by the
EPRV Research Coordination Network



EPRV Colloquium Series: July 28th 2022
8a PT / 11a ET / 4p UK / 5p CEST
Speaker: Dr. Sam Halverson
*"Instrumental challenges in the EPRV era --
current and future technological hurdles on
the road towards 10 cm/s"*

Presented by the
EPRV Research Coordination Network



EPRV Colloquium Series: Dec 15th 2022
8a PT / 11a ET / 4p UK / 5p Geneva
Dr. Nathan Hara
*"Statistical methods for
radial velocity analysis"*

Presented by the
EPRV Research Coordination Network

The EPRV RCN

Digital Resources:

- Google Drive with full archive of presentations & meetings
- RCN directory with 100+ members' interests/expertise
- Slack workspace with spaces for new paper alerts, job postings, etc

New ROSES Call [D.18 EPRV]

- Step 1 Proposals Due : **Feb 16, 2023**
- Areas of science :
 - Studies of how stellar surface phenomena impact the radial velocity time series measurements of disk-integrated spectra and how those impacts vary over relevant time scales
 - Analyses of disk-integrated PRV observations of the Sun and/or standard stars designed to evaluate the effectiveness of mitigation strategies for stellar RV variability and instrument systematics
 - Development of advanced statistical methodologies to analyze complex radial velocity datasets to enable detection of small planets and precisely measure their masses
 - Interdisciplinary research that capitalizes on heliophysics datasets beyond just those from the solar feeds of existing EPRV instruments to help model/detrend/interpret disk-integrated solar RV measurements for broad application in stellar astrophysics

We are pleased to announce that the next iteration of the EPRV Conference series will take place March 27 - 30, 2023 at the Hilton Beachfront Resort in Santa Barbara, California



Conference agenda posted to the website

Poster submission & Early Registration deadline February 17th

<https://conference.ipac.caltech.edu/eprv5/>

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To join: <https://exoplanets.nasa.gov/exep/NNExplore/EPRV-RCN>

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