

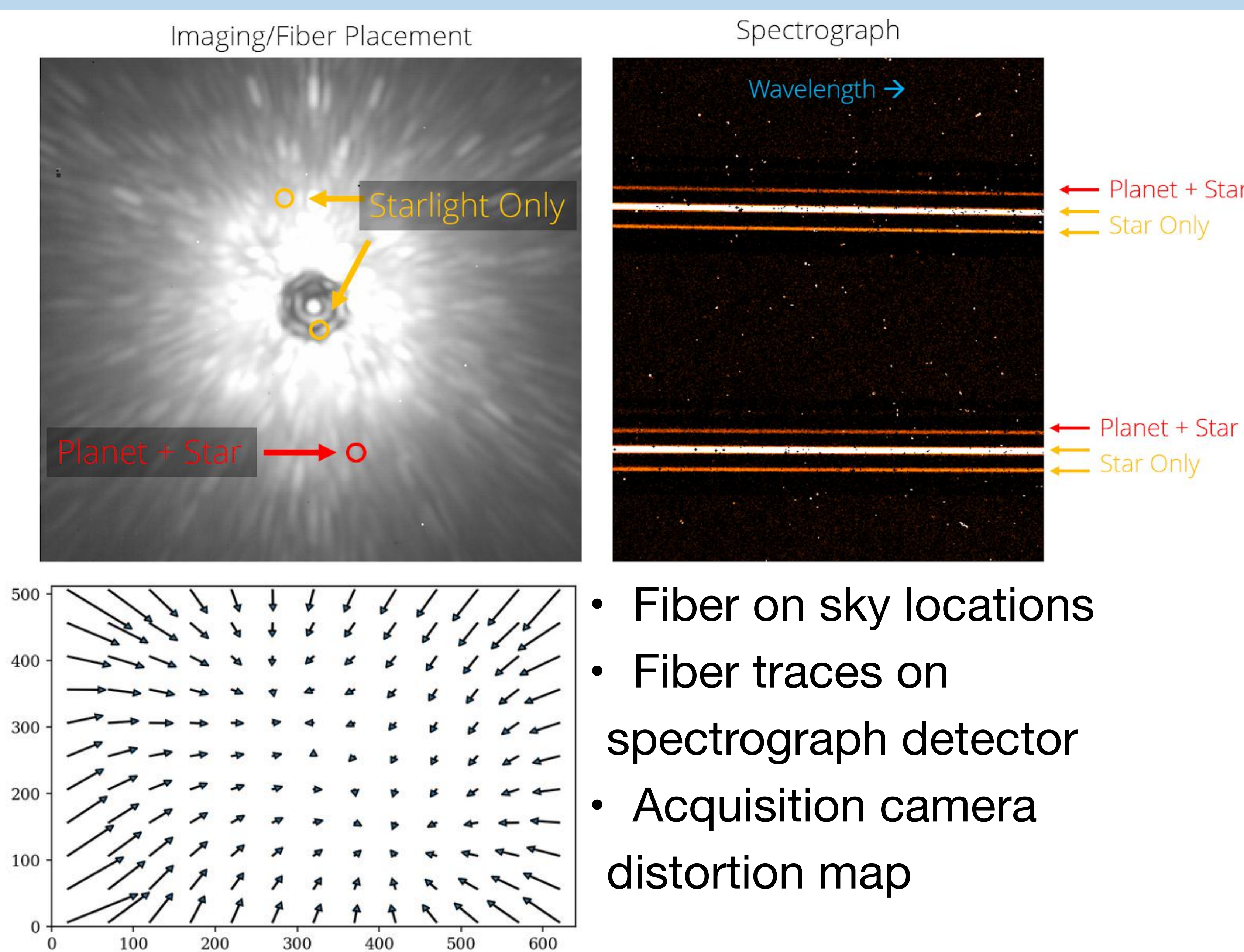
The Keck Planet Imager and Characterizer

Phase I fiber injection unit early performance



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The Keck Planet Imager and Characterizer (KPIC) is an upgrade to the Keck II adaptive optics system and instrument suite with the goal of improving direct imaging and high-resolution spectroscopic characterization capabilities for giant exoplanets. KPIC Phase I includes a fiber injection unit (FIU) downstream of a new pyramid wavefront sensor, coupling planet light to a single mode fiber fed into NIRSPEC, Keck's high-resolution infrared spectrograph. This enables high-dispersion spectroscopy (HDS) of directly imaged exoplanets at smaller separation and higher contrast. We report performance results from the KPIC Phase I FIU commissioning, including analysis of **throughput**, **stability**, and **sensitivity** of the instrument.

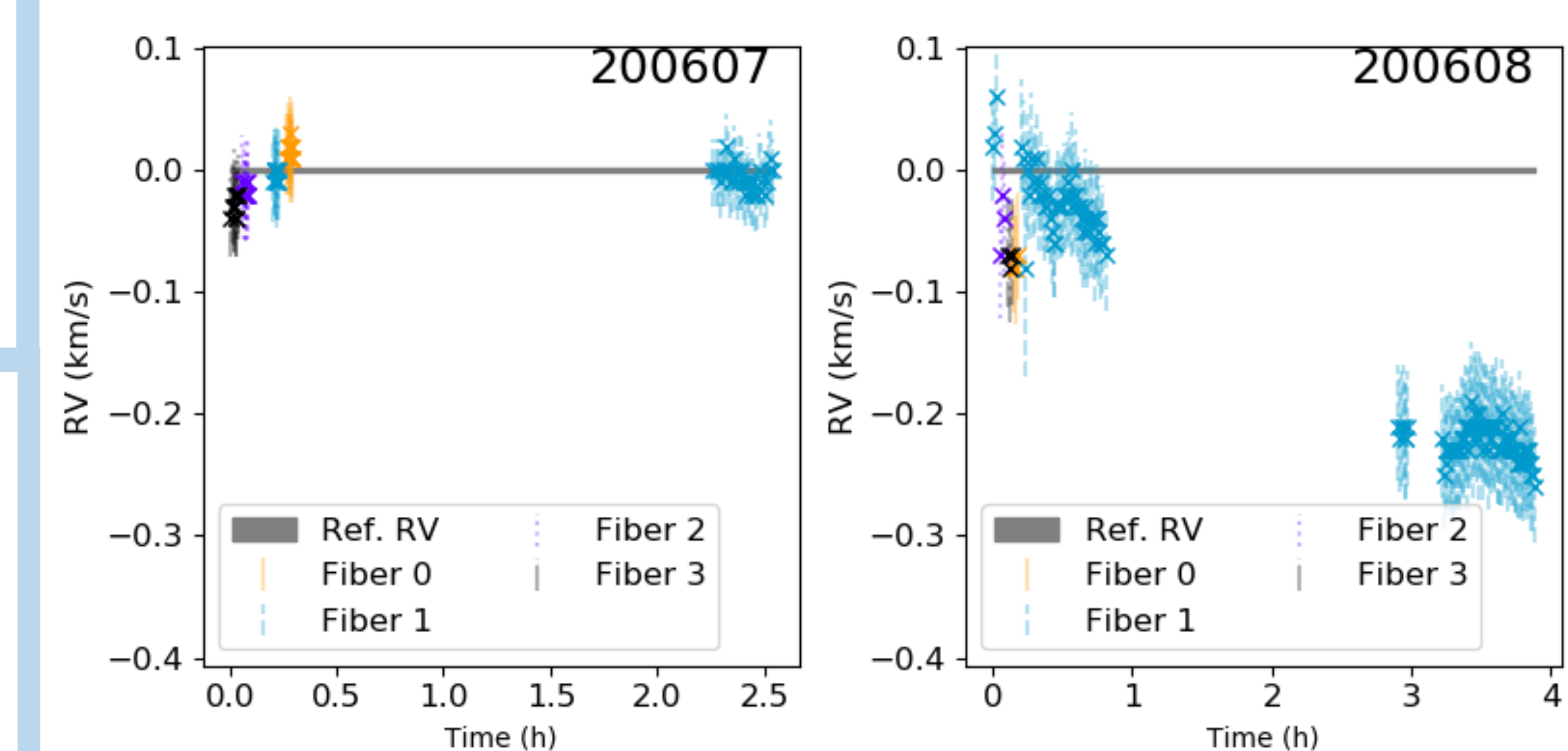
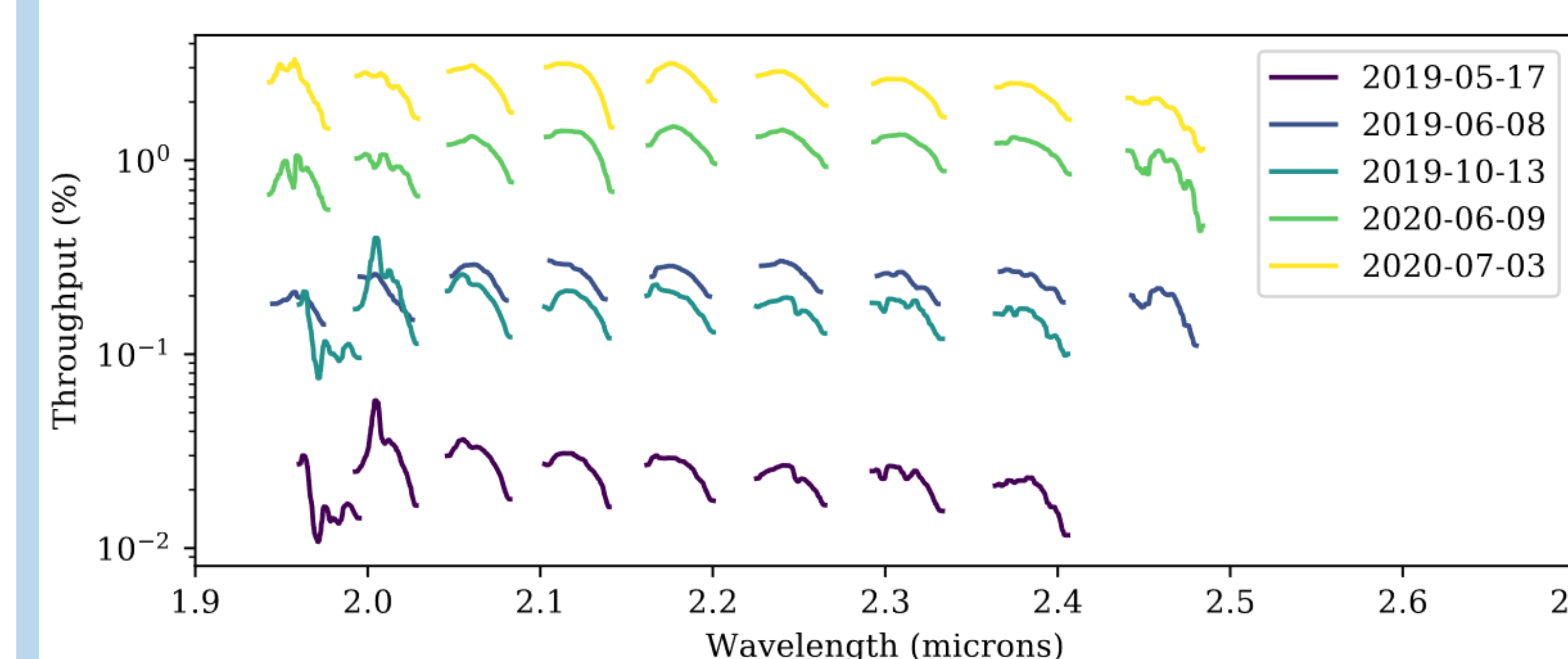


Observing procedure:

- Track on primary
- Blind offset to companion using known orbital parameters or imaging to determine separation and position angle, adding acquisition camera distortion.
- Star fibers placed at several distances to the primary
- One planet + starlight fiber
- Alternate between primary and secondary for calibration and science data.

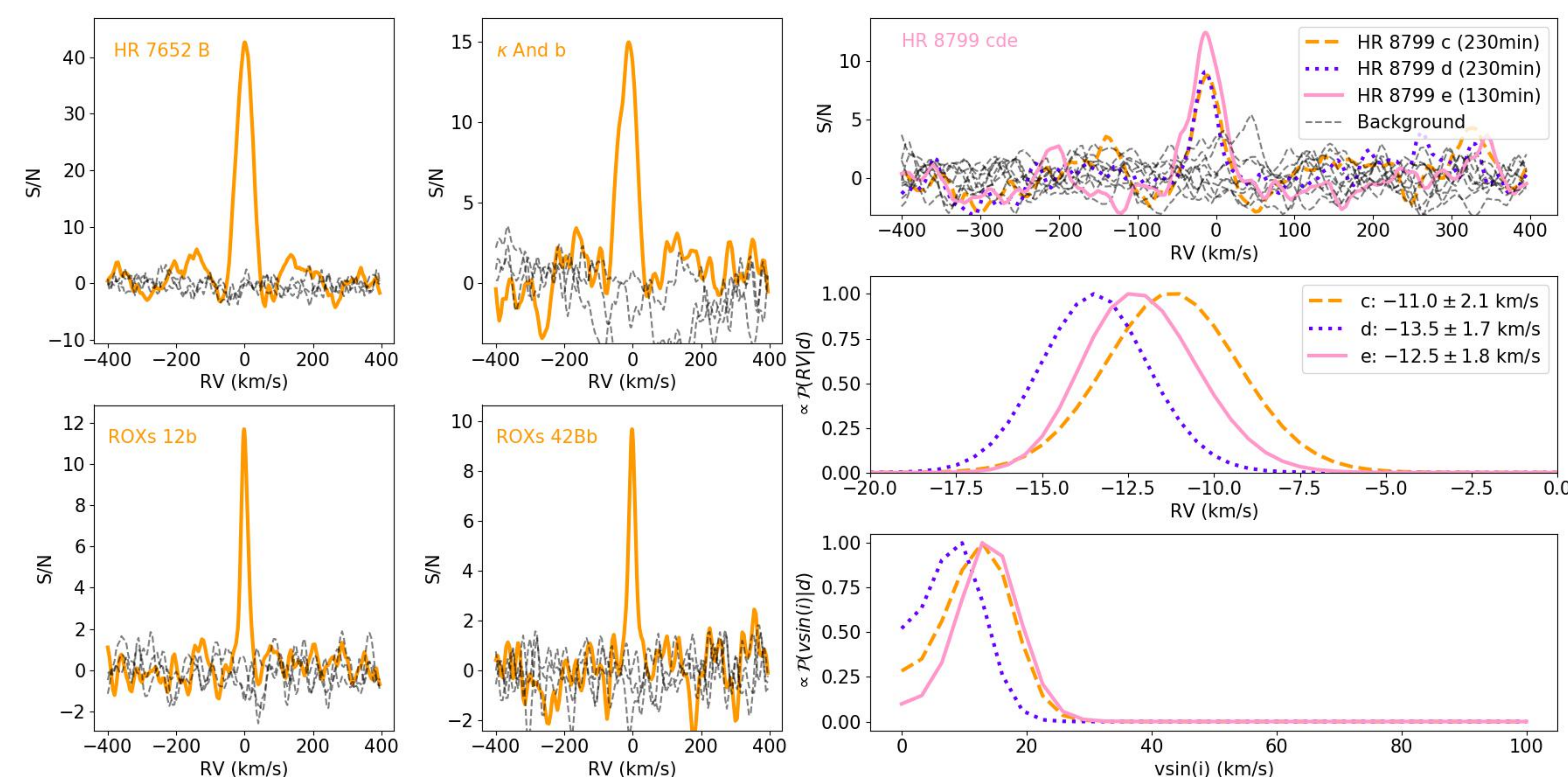
Throughput:

- Significant improvements with recent upgrades and characterization efforts



Wavelength solution stability:

- Stable over the course of a night unless other instrument settings are changed



Early science results:

- Molecular detection
- Radial velocity and planetary spin

Future work:

- Doppler imaging
- Abundance measurements

KPIC within Keck:

