

Recon Spectroscopy with TRES

Dave Latham for the TRES team

TRES Team

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Spectroscopic Surveys at CfA

- CfA Digital Speedometers
 - 1979 – 2009, 3 telescopes, 259,000 observations
 - Cassegrain, slit, photon-counting Reticons, R=44K
 - Precision floor ~ 150 m/s
 - First RV survey for planets started in 1984
 - First RV planet candidate in 1988 (HD 114762)
 - G-dwarf planet survey on HIRES started in 1997
 - RV planet shows transits in 1999 (HD 209458)

Role of Recon Spectroscopy

- Goal: confirm/characterize transiting planets
- Spectrum of candidate is good for PRV work?
 - Not too hot, not too much rotation, not evolved
 - Evaluate activity indicators, e.g. Ca II H&K
- Provide improved stellar parameters
 - T_{eff} , $\log(g)$, $[m/H]$ \rightarrow host star mass and radius
- Identify stellar companions
 - Composite spectra, large velocity variations

New Workhorse Spectrograph - TRES

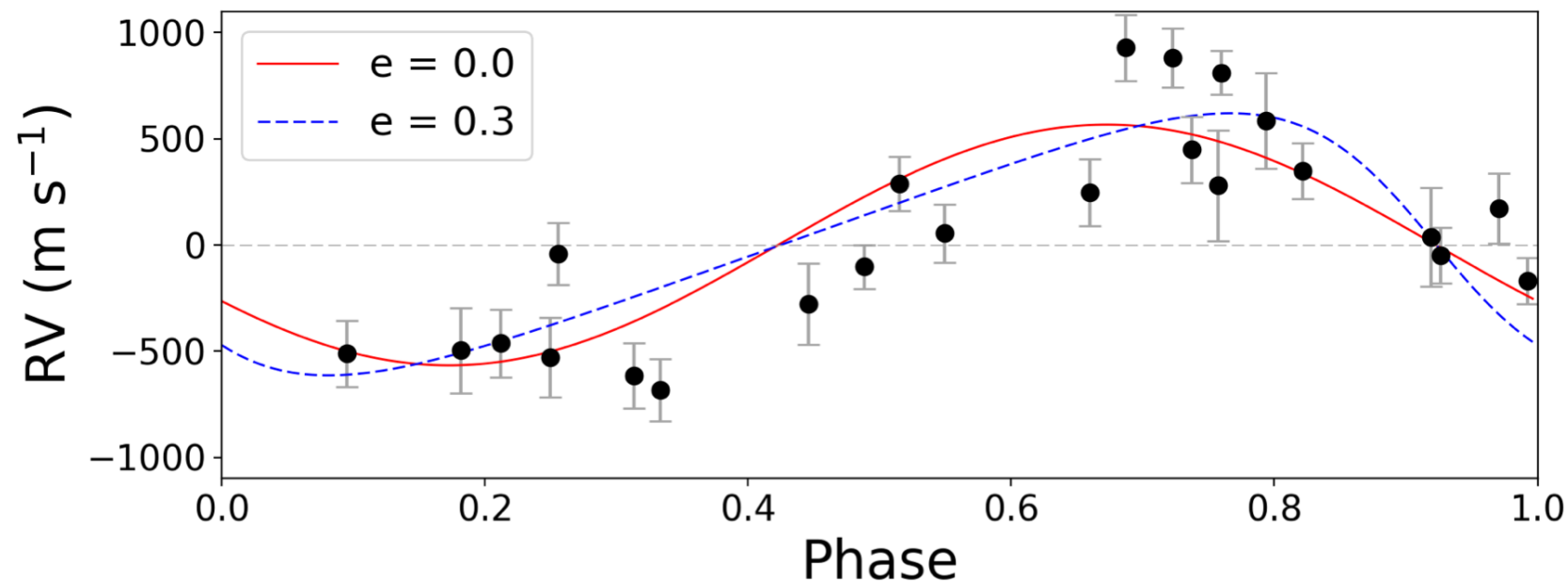
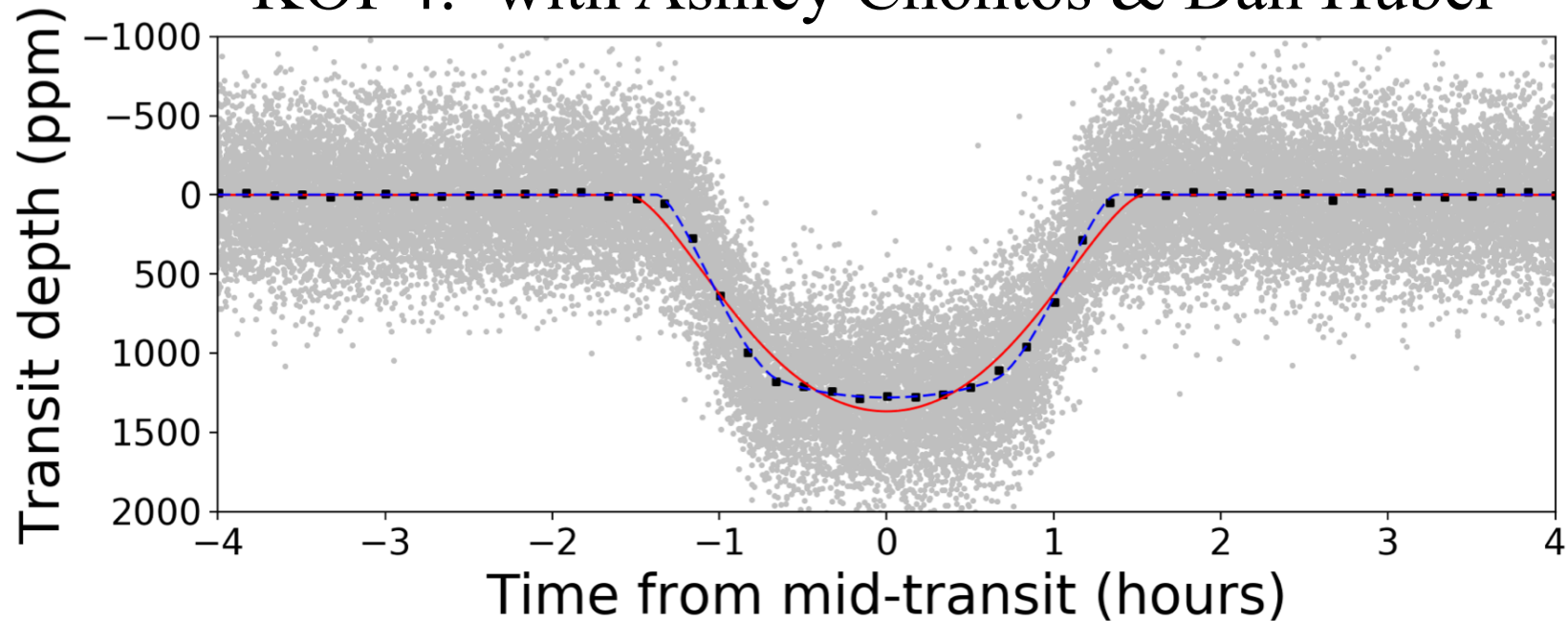
- Tillinghast Reflector Echelle Spectrograph
 - 2009 → now, 60-inch at FLWO: 49,814 obs
 - Coudé, fiber-fed, CCD, stabilized, $R=44K$
 - Precision floor ~ 15 m/s
 - Zero-point stability ~ 10 m/s
 - Limiting magnitude $V\sim 15$

TRES Recon Record

Project	Observations	Targets
HATNet	3,400	1,455
KELT	2,168	568
QES	1,868	739
Kepler	1,932	1,342
K2	1,034	598
Total	10,402	4,702
TESS	?	?

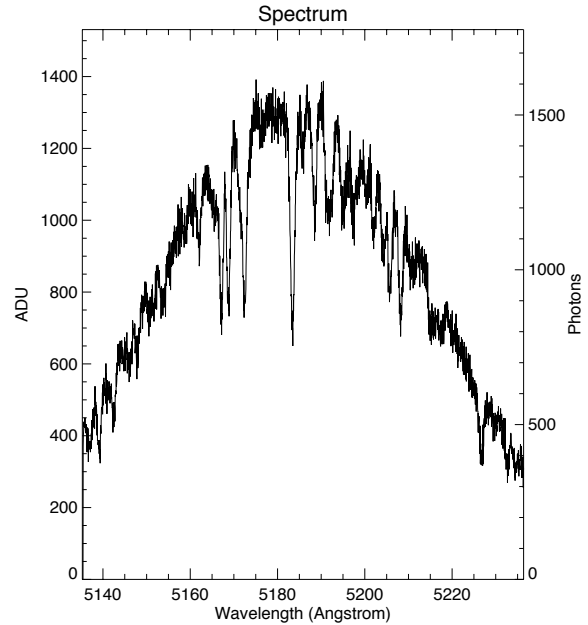
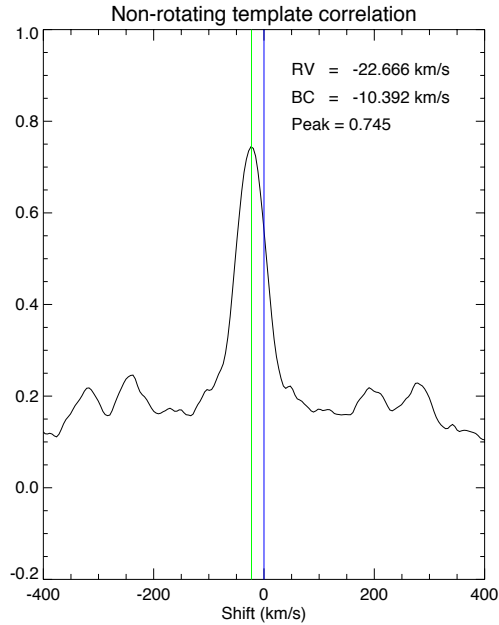
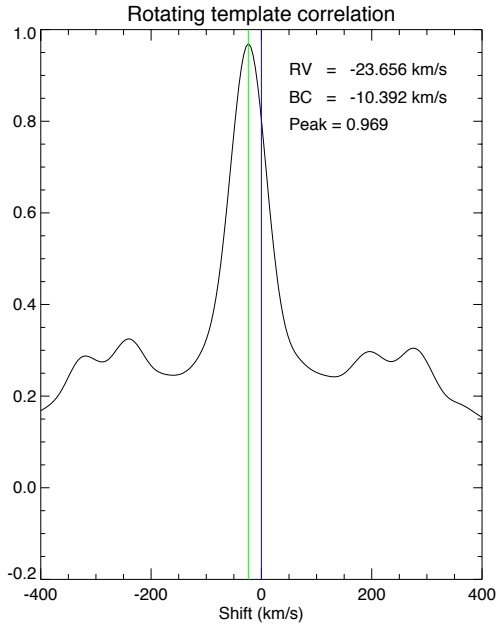
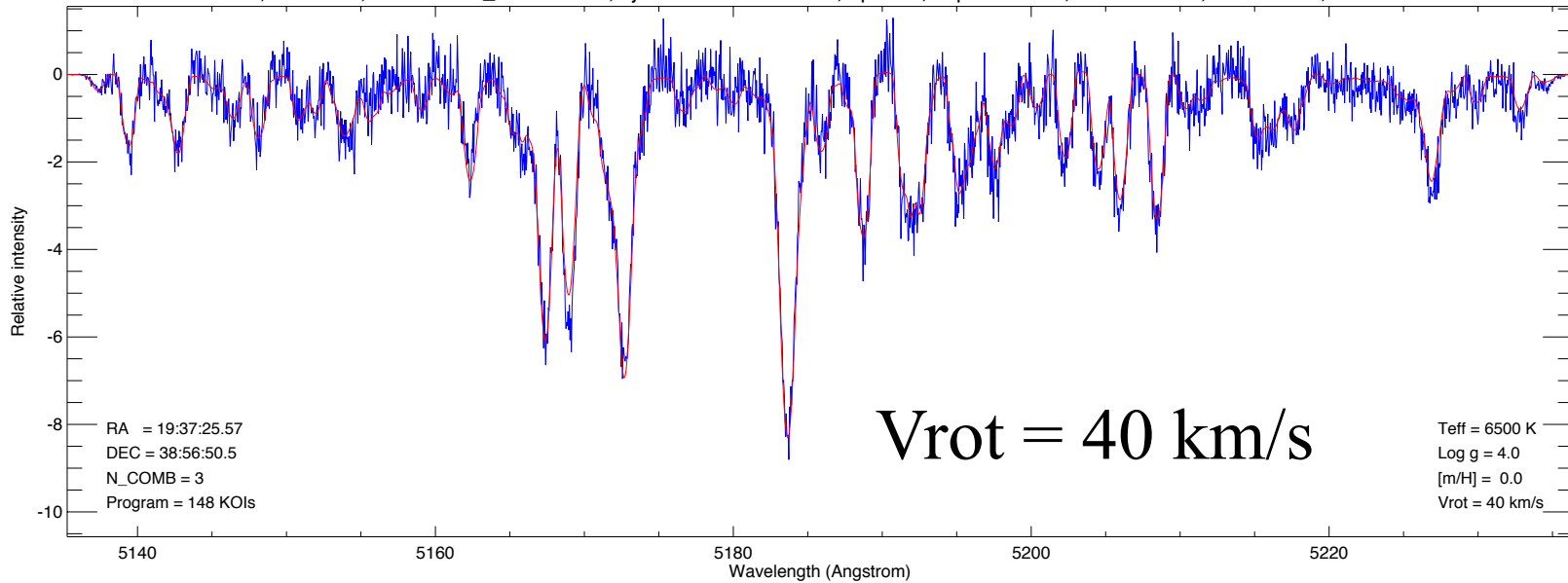
TRES orbits, Rossiter-McLaughlin, Doppler Tomography
PRV follow-up for Kepler/K2 masses with HARPS-N

KOI-4: with Ashley Chontos & Dan Huber



KOI-4

K00004, obs = TR, 2017-09-13_04h55m08s, hjd = 2458009.717813, ap = 23, expt = 1800 s, SNRe = 61.3, Rpv = 2.55, SPCv = 2.60



KELT-7

Doppler Tomography
with George Zhou
Planets orbiting A stars
before they retire

