Characterization of exoplanetary environments with 2-m class telescopes

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Motivation:

The TESS space mission is discovering new and bright stars with exoplanets for further ground based follow-up. The telescope time is precious and therefore, we would like to present how 2-m class telescopes equipped with modern spectrographs can help to characterize exoplanets with focus on their atmospheres. We discuss the feasibility of characterization of exo-atmospheres with 2-m class telescopes. We also present some of the 2-m class facilities.

The test data set:

FEROS @ MPIA 2.2-m telescope, spectroscopic data (high. Res) of WASP-18b transit. The target was selected as the only visible during the awarded observing window in 2016.

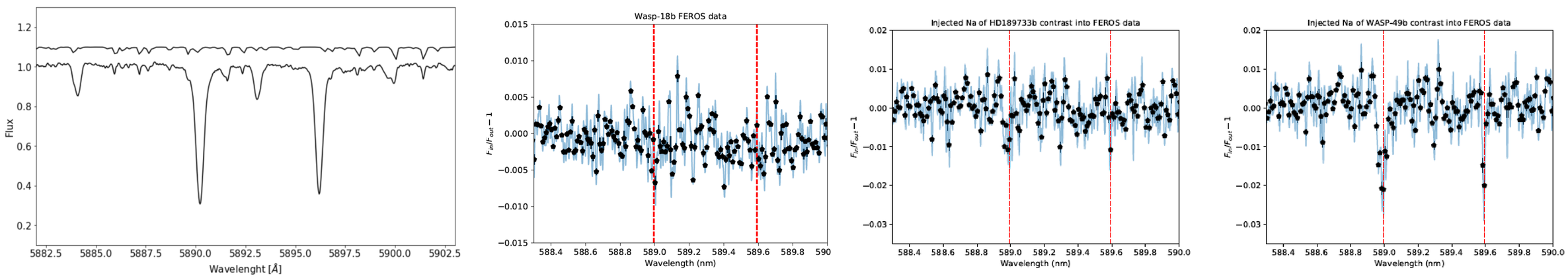

Figure 1 from the left: Reduced spectra around NaD lines and above model telluric spectrum. Second graph from left shows expected non-detection in the Wasp-18b data set. Last two graphs on the right show injected NaD in the WASP-18b data set with clear detections. Abundances for injected NaD are similar as found in HD189733b and WASP-49b.

Best targets for 2-m class telescopes:

We present a selection of available good targets for 2-m class telescopes in Fig 2 based on their expected atmospheric signature of NaD lines. The most promising planets for characterization follow-up observing are named.

Figure 3 shows an expected distribution of planets for TESS space mission with a detection threshold for 2-m class telescopes indicated by orange line.

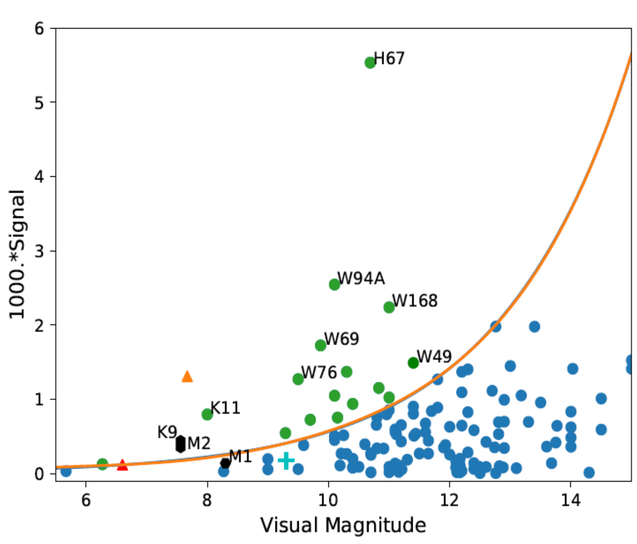

Figure 2: Currently best candidates for follow-up With 2-m class facility.

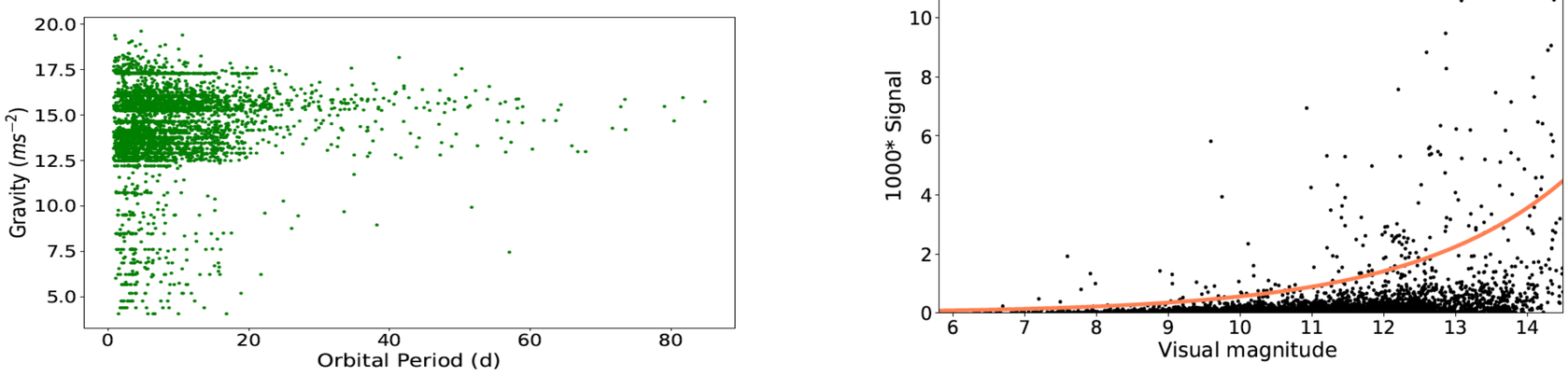

Figure 3: *Left* – Expected planet detections distribution based on their Gravity value vs. Orbital Period. *Right* – Expected signal from TESS planets with a 2-m class threshold indicated by an orange line.

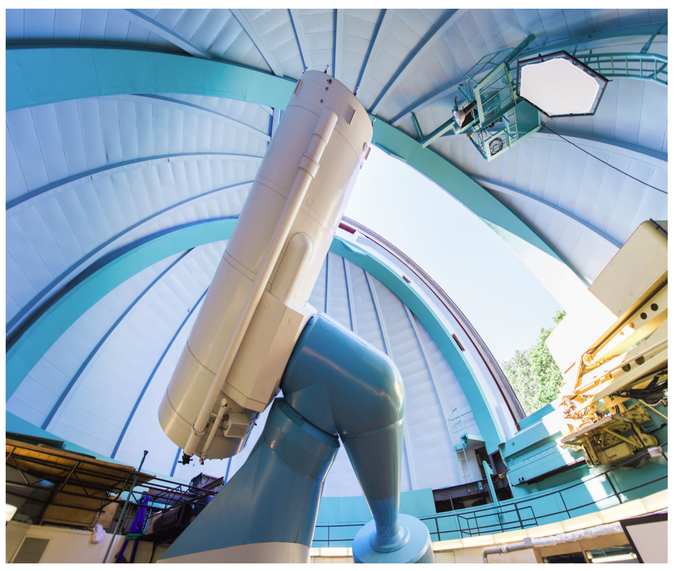

Figure 4: Perek 2-m telescope. See poster of J. Subjak for more details.

Figure 5 right: PLATOSPEC a future 2-m class spectrograph at ESO La Silla. PLATOSPEC will be dedicated to follow-up of PLATO space mission targets.

PlatoSpec

Echlle spectograph	Parametere value
Wavelength coverage	360-680 nm
Spectral resolution	70k
Thermal stability	0.1deg
RV accuracy	3m/s
Calibration	ThAr+Iodine cell

References:

Kabath et al., 2019PASP..131h5001K
http://stelweb.asu.cas.cz/plato
http://stelweb.asu.cas.cz/exogroup/l

Acknowledgments:

Grant - 17-01752J - Czech Grant Agency (GACR), DAAD-18-08 programme. MINECO under the grant AYA2017-83383-P and Postdoc@MUNI project CZ.02.2.69/0.0/0.0/16 027/0008360