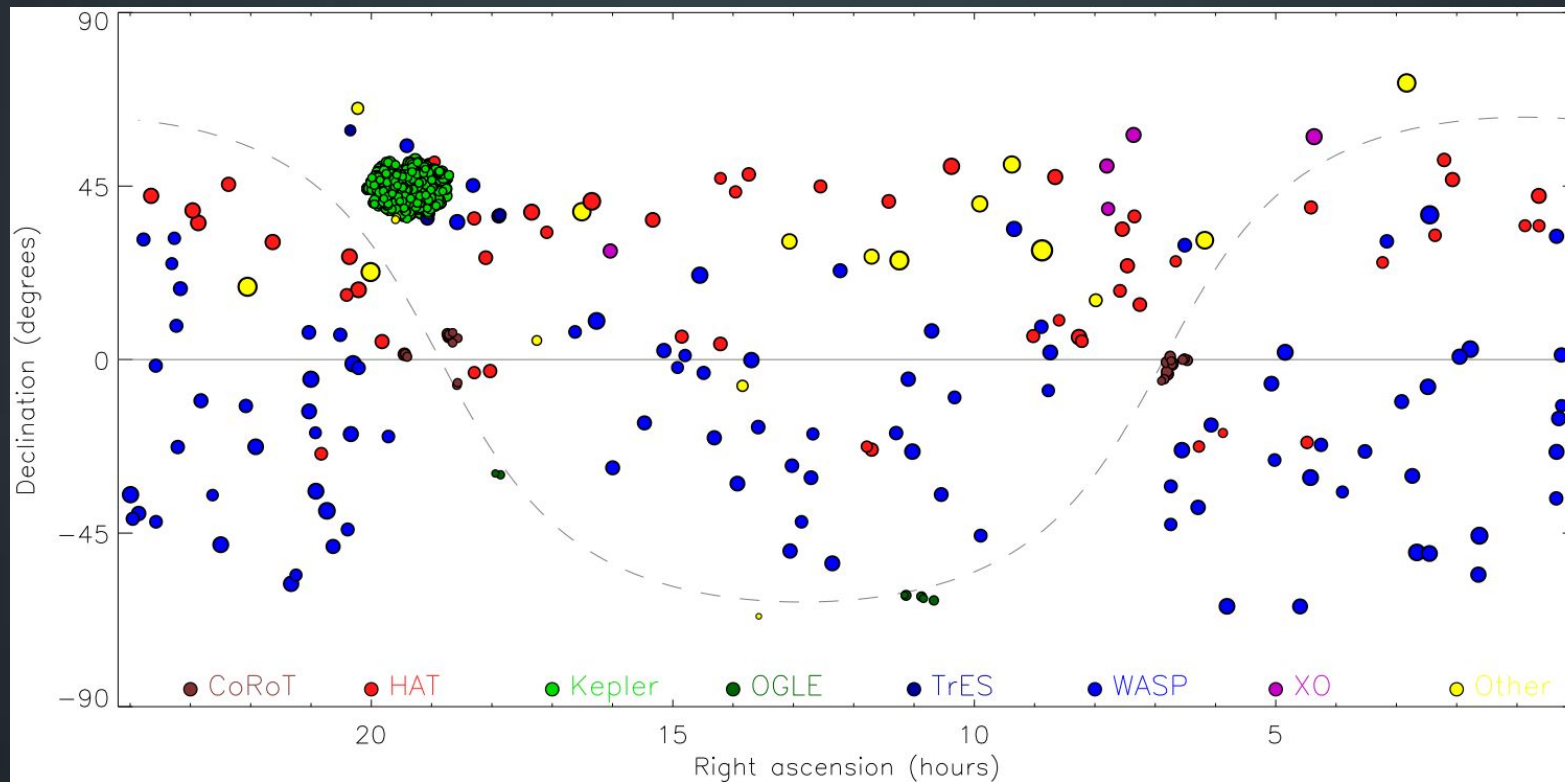


Search for new transiting exoplanets in the frame of the «Kourovka Planet Search»

Burdanov A. (Ural Federal Univ.)
Benni P. (Acton Sky Portal)
Krushinsky V. (Ural Federal Univ.)
Popov A. (Ural Federal Univ.)
Sokov E. (Pulkovo observatory)

Scientific rationale



Southworth J. Observational studies of transiting extrasolar planets // arXiv:1411.5517

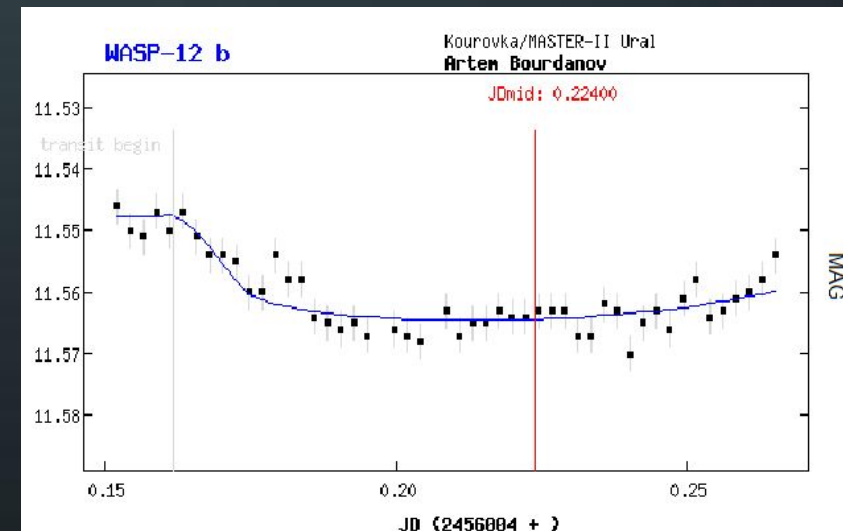
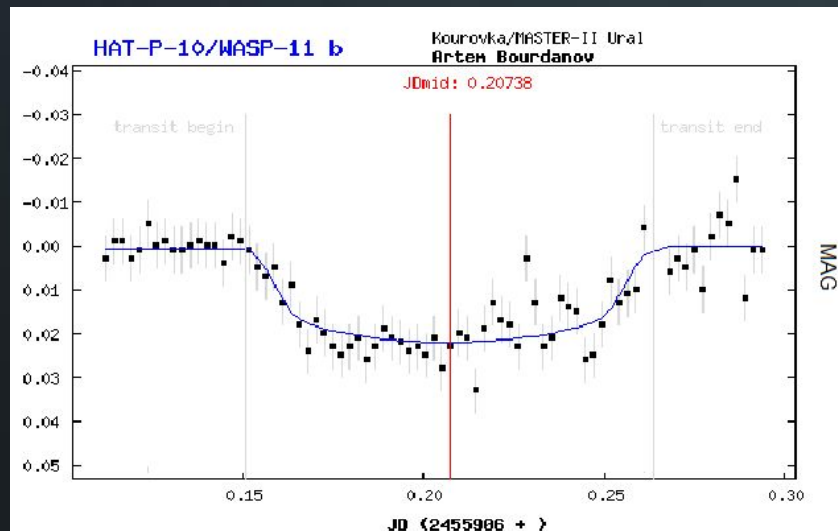
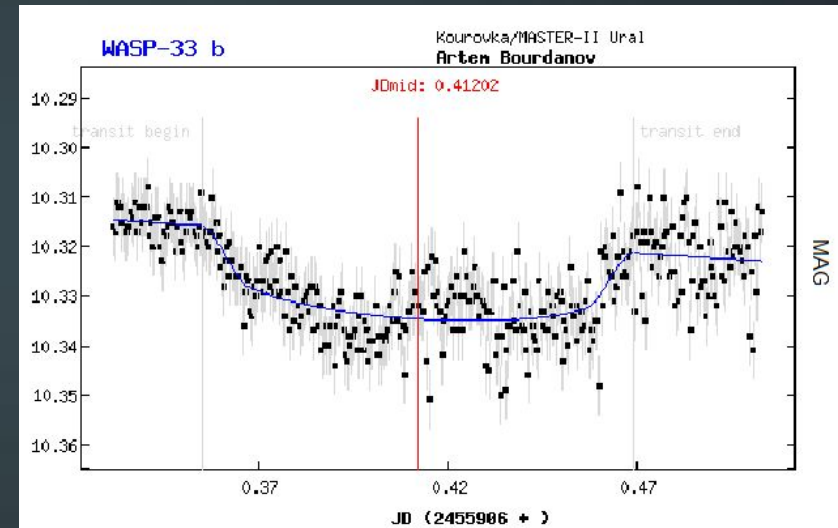
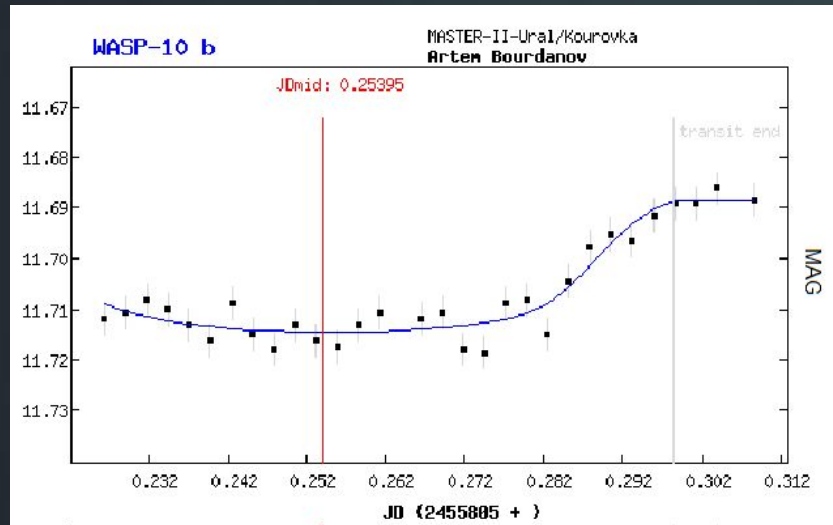
- not the whole sky is covered with recent exoplanet surveys;
- population of about 1600 known exoplanets, but affected by the selection effects — tip of the iceberg;
- every new exoplanet with defined properties will contribute to the planet population synthesis;

MASTER-II-Ural telescope



- Located at the Kourouka observatory ($\varphi = 57^\circ$ N, $\lambda = 59^\circ$ E, $h = 290$ m);
- 2 parallel catadioptric tubes ($D = 400$ mm, $F = 1000$ mm);
- 4K x 4K ALTA U16M ;
- FOV = $2^\circ \times 2^\circ$; scale – 1.8 " / px;
- BVRI filters, 2 polarizers, H-alpha;

Observations of known transiting exoplanets

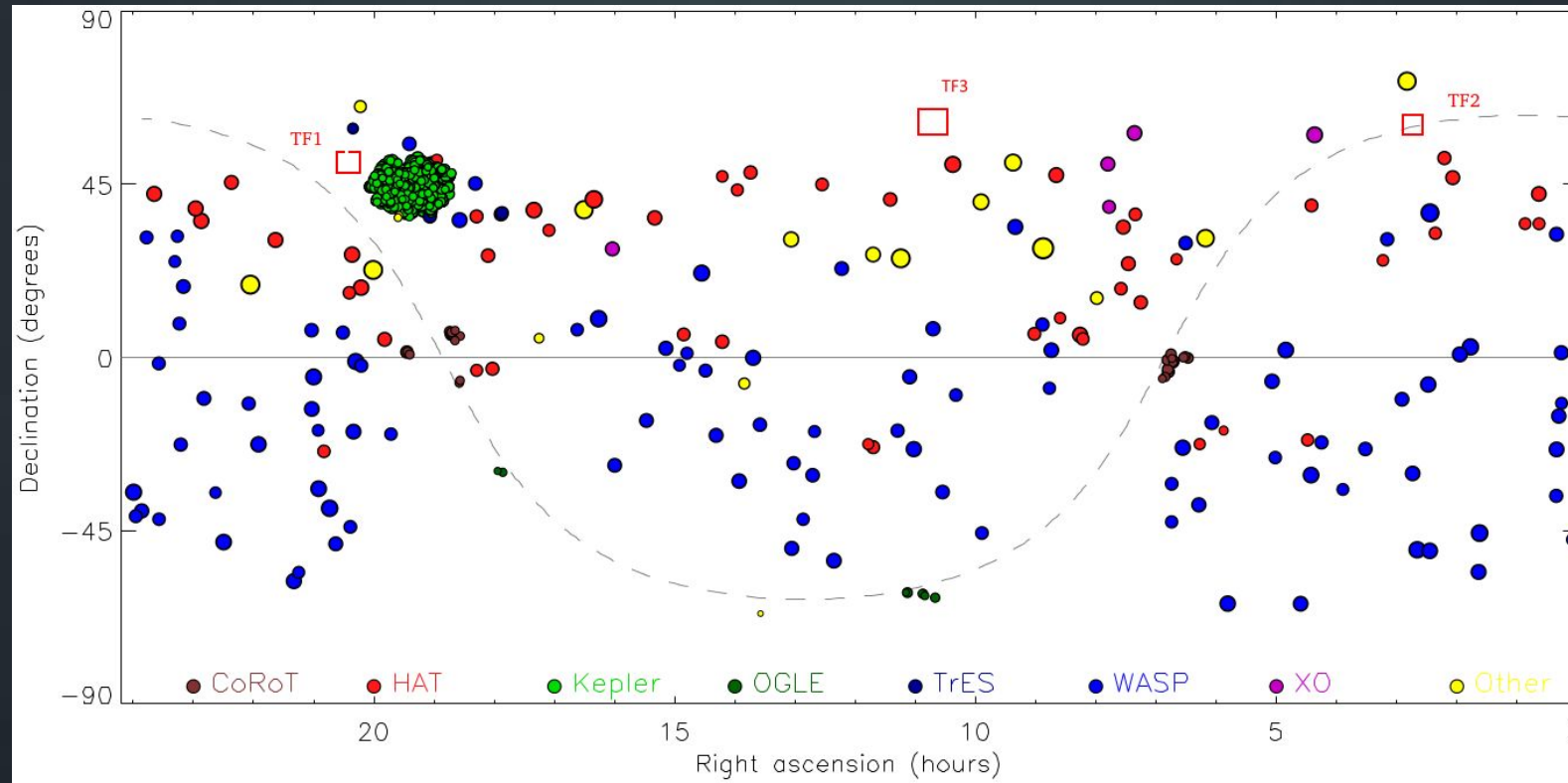


Rowe-Ackermann Schmidt Astrograph



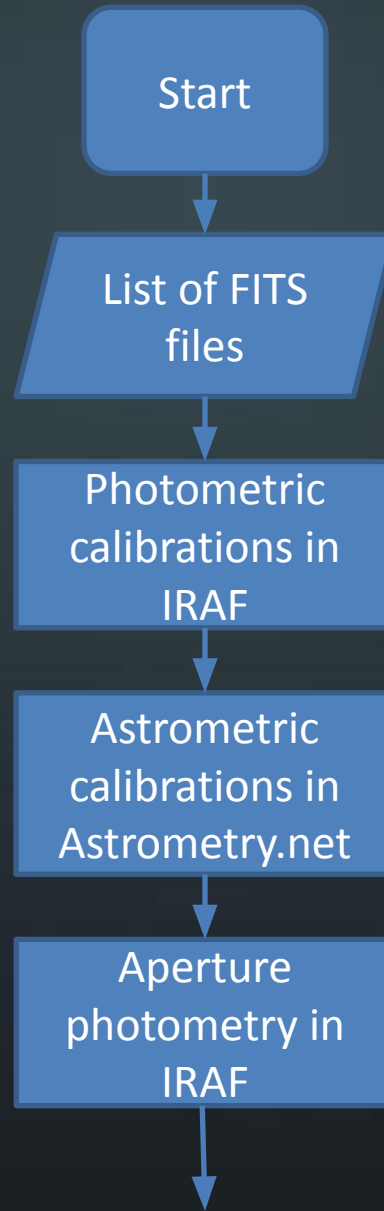
- Located at Acton (USA) ($\phi = 43^\circ \text{ N}$, $\lambda = 71^\circ \text{ W}$, $h = 80 \text{ m}$);
- one catadioptric tube ($D = 279 \text{ mm}$, $F = 620 \text{ mm}$);
- SBIG ST-8300M;
- FOV = $1.2^\circ \times 1.6^\circ$; scale – $1.8'' / \text{px}$
- R and CBB filters;

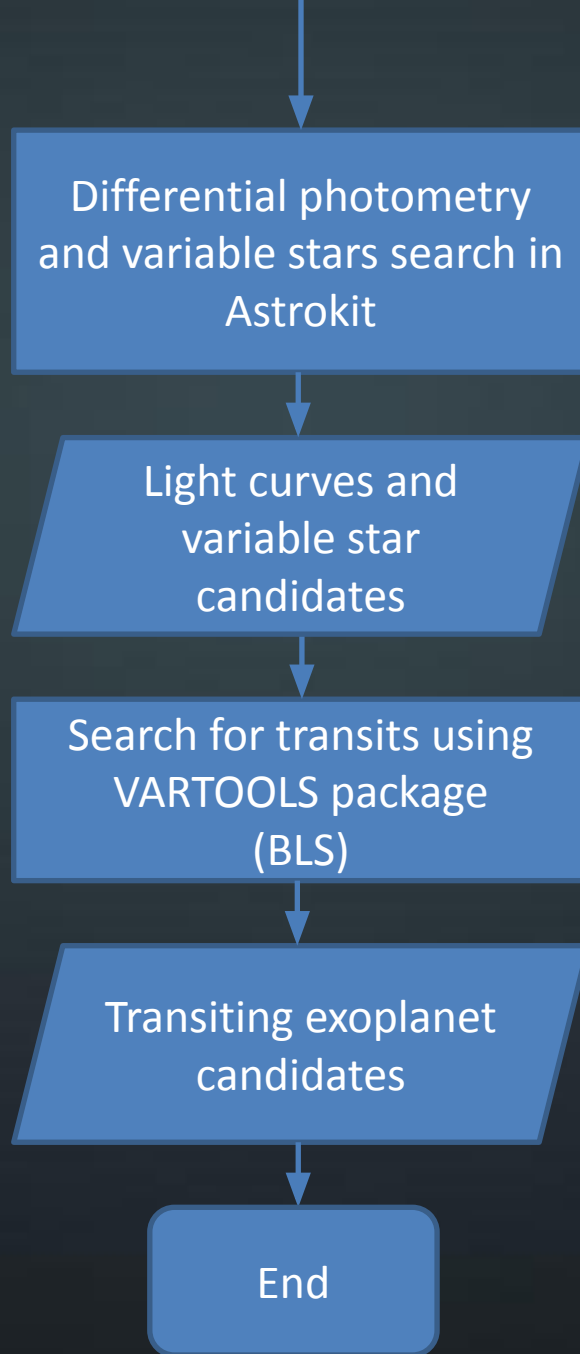
Search for new transiting Hot Jupiters



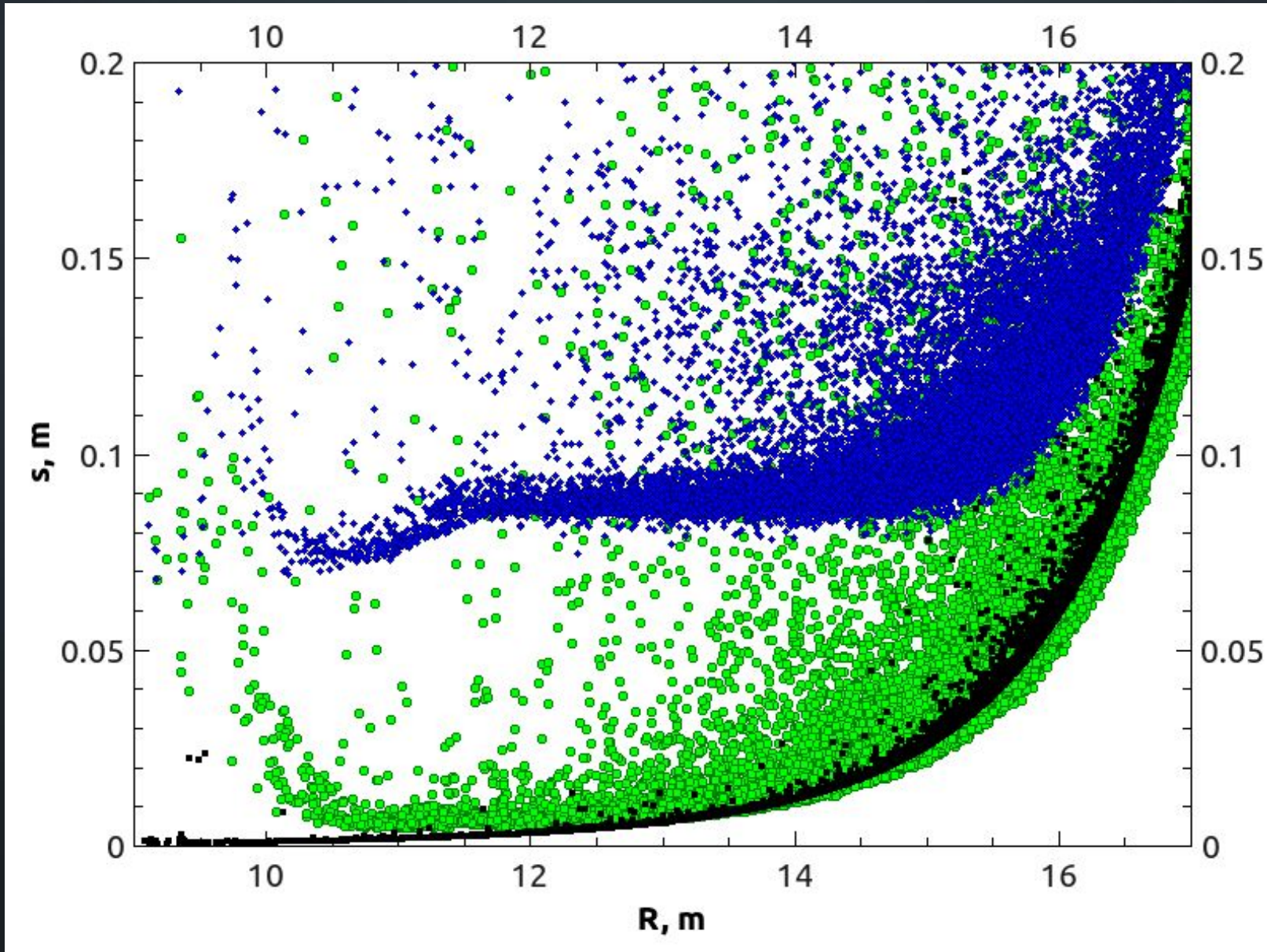
- 2012/2013 – Target Field 1 observations (MASTER-II-Ural);
- 2013/2014 – Target Field 2 observations (MASTER-II-Ural + RASA);
- 2014 – Target Field 3 observations (RASA);

Data reduction





Photometric precision



Photometric precision

Standard deviation < 20 mmag

Area	Telescope	Total number of stars	Low-noise stars
TF1	MASTER-II-Ural	23 500	25.5%
TF2	MASTER-II-Ural	15 000	18.0%
sub-TF2	RASA	8 500	18.2%
TF3	RASA	1 000	20.9%

Discovered exoplanet candidates

Internal ID	R mag	V mag	Period d	Depth mag	Duration h
KPS-TF1-3154	12.4	12.7	0.847	0.02	1.6
KPS-TF1-19251	13.9	14.3	0.983	0.025	1.7
KPS-TF2-11789	14.2	14.4	1.35	0.02	2
KPS-TF3-663	12.6	13.1	1.706	0.01	1.5

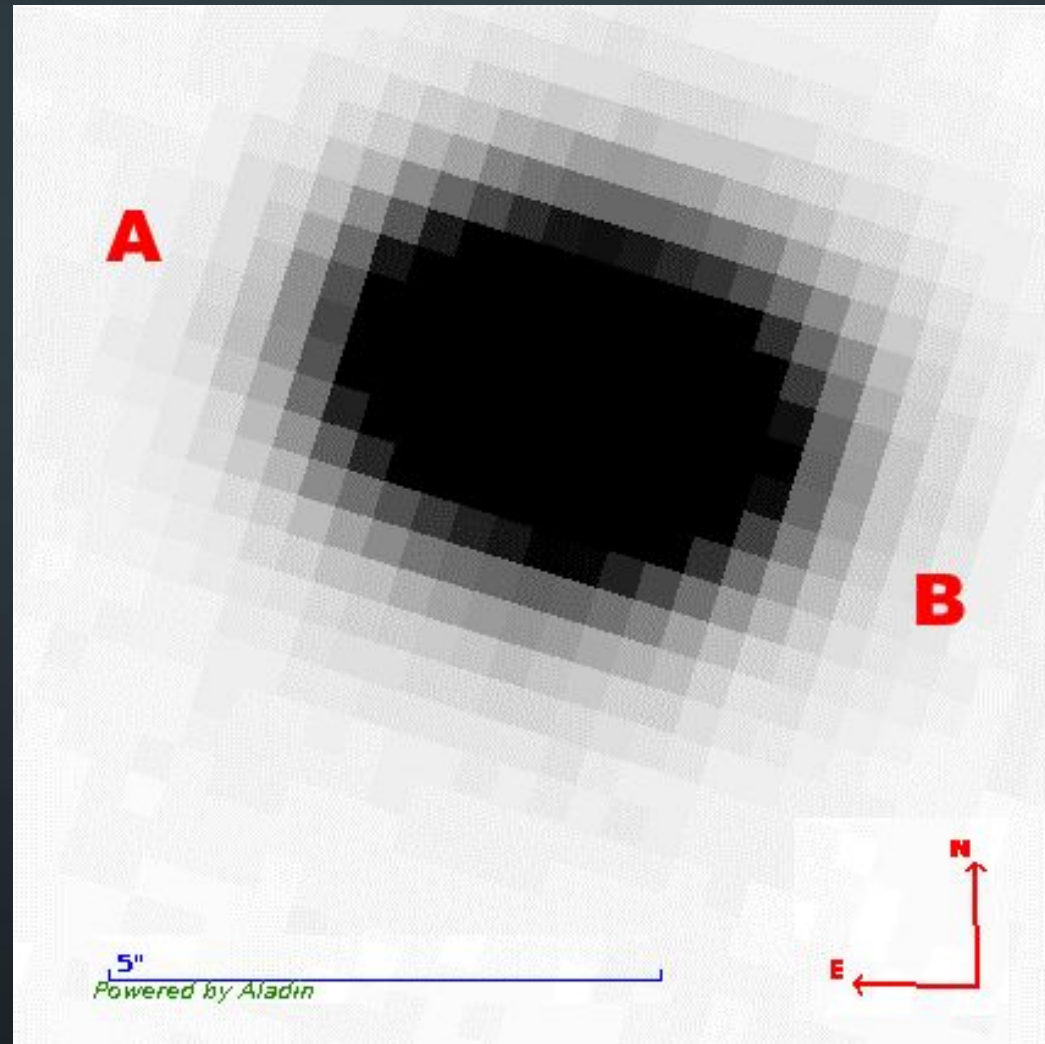
Follow-up observations

Telescope	Observatory
Celestron EdgeHD 11 SCT MTM-500	Acton Sky Portal Kislovodsk Mountain Astronomical Station
MASTER-II-Tunka	Irkutsk State University Astrophysical Center
ZA-320M Kreiken	Pulkovo Observatory Ankara University Kreiken Observatory
T100 0.6-m Cassegrain	TUBITAK National Observatory Torun Centre for Astronomy Observatory
BTA KAO-1.2-m	Special Astrophysical Observatory Kourovka Observatory

Discovered exoplanet candidates

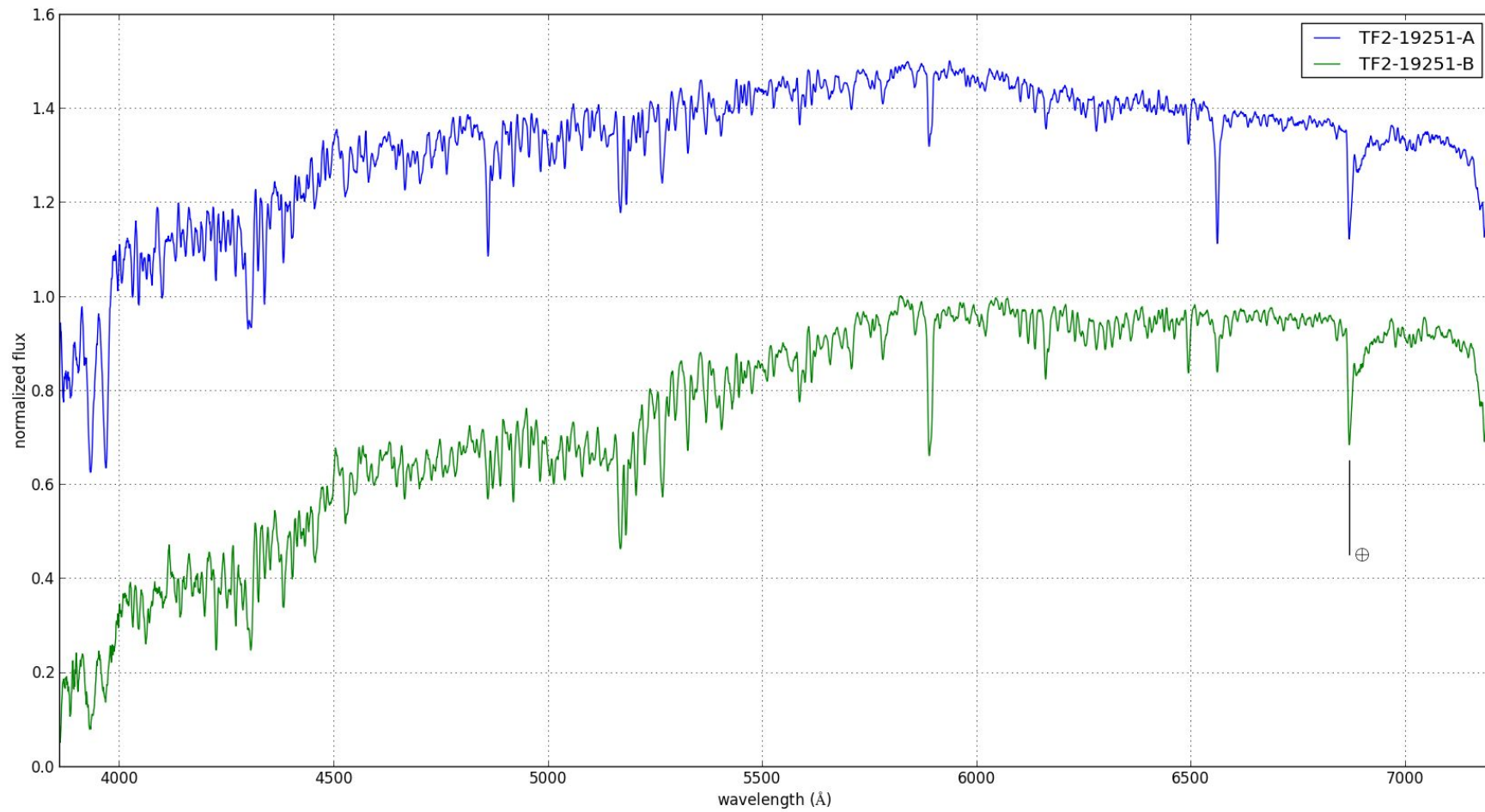
Internal ID	R mag	V mag	Period d	Depth mag	Duration h
KPS-TF1-3154	12.4	12.7	0.847	0.02	1.6
KPS-TF1-19251	13.9	14.3	0.983	0.025	1.7
KPS-TF2-11789	14.2	14.4	1.35	0.02	2
KPS-TF3-663	12.6	13.1	1.706	0.01	1.5

KPS-TF1-19251



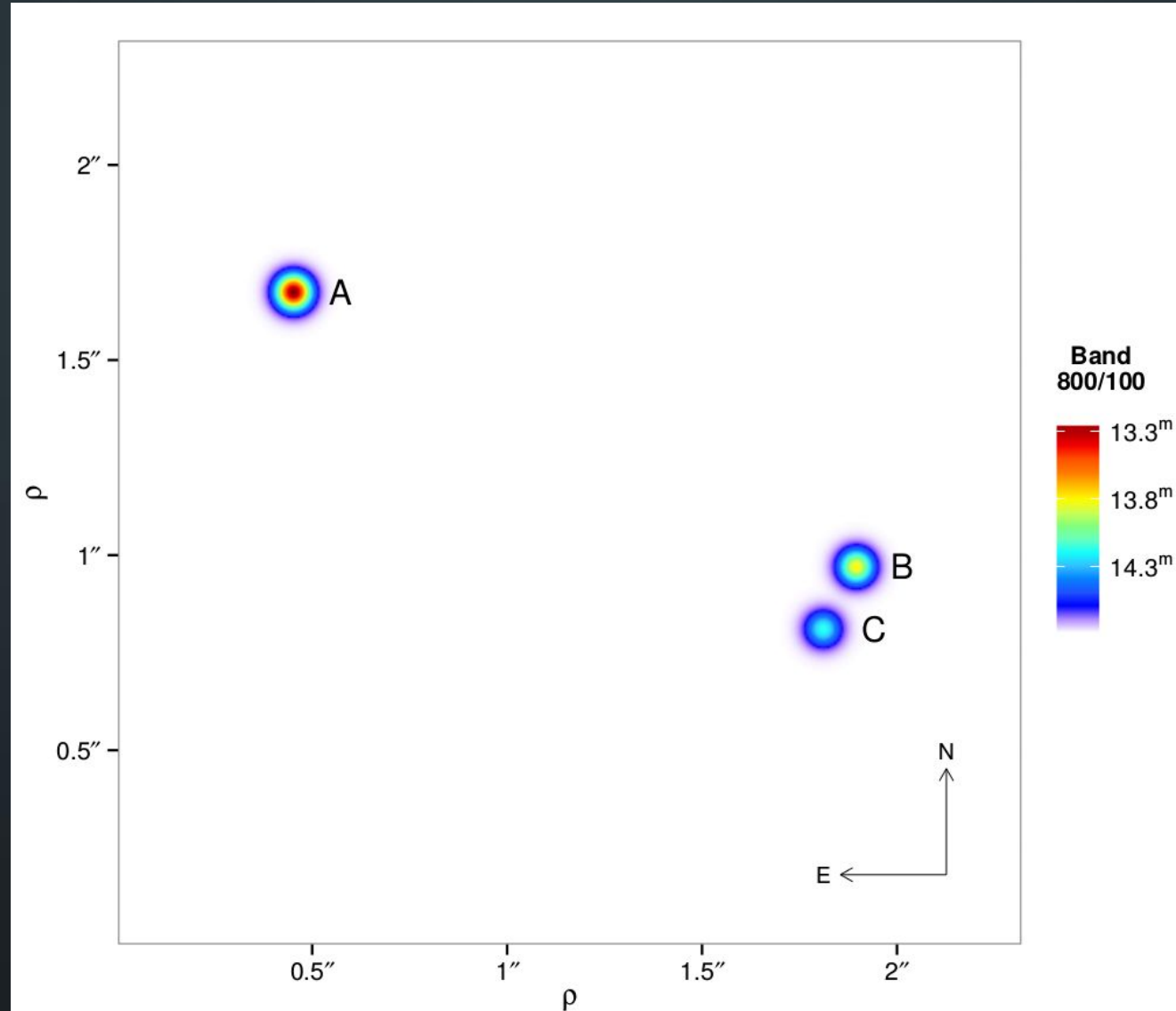
$D = 1.3''$

KPS-TF1-19251



G2&K0

KPS-TF1-19251



True depth

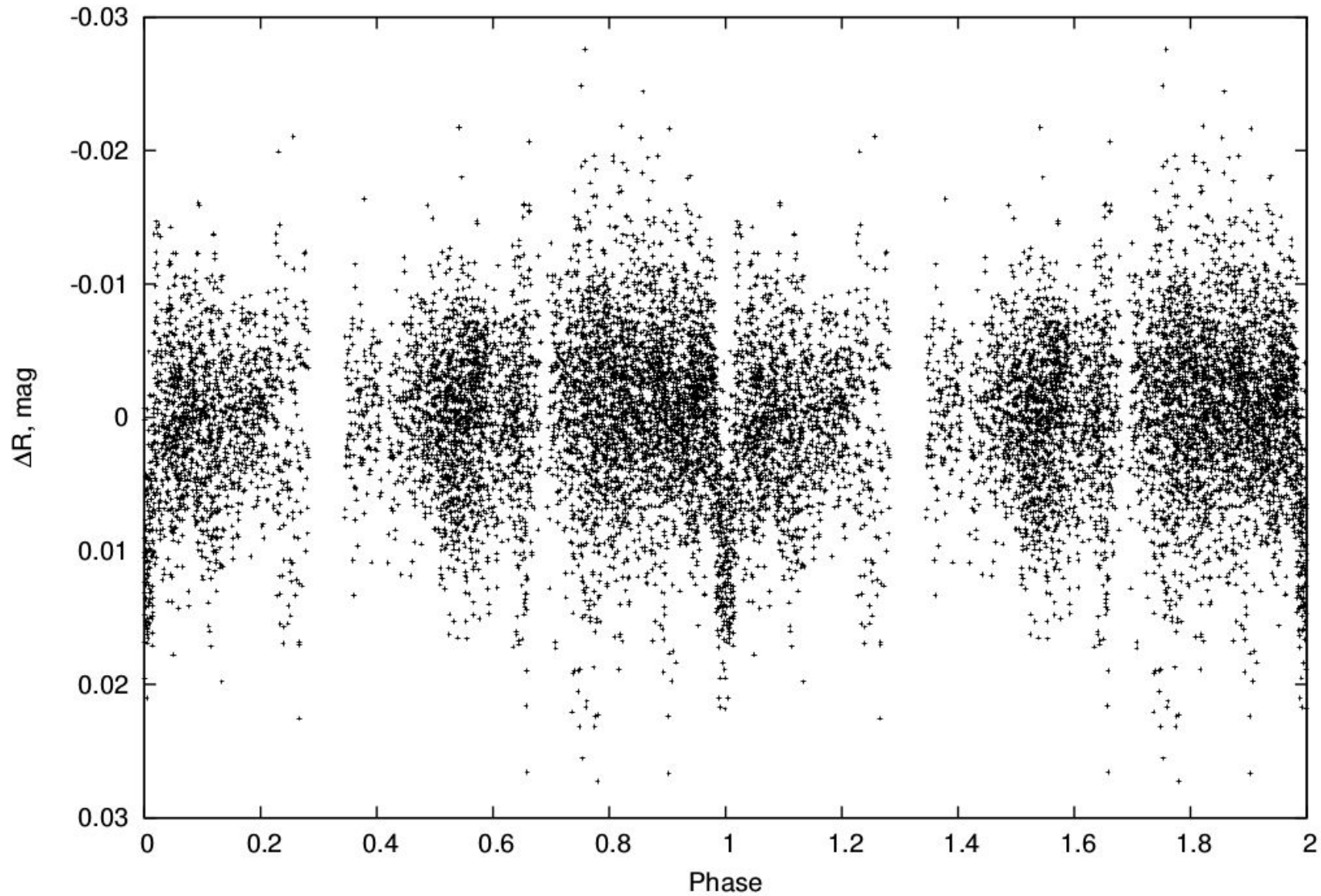
$$\Delta A = 0.05^m$$

$$\Delta B = 0.08^m$$

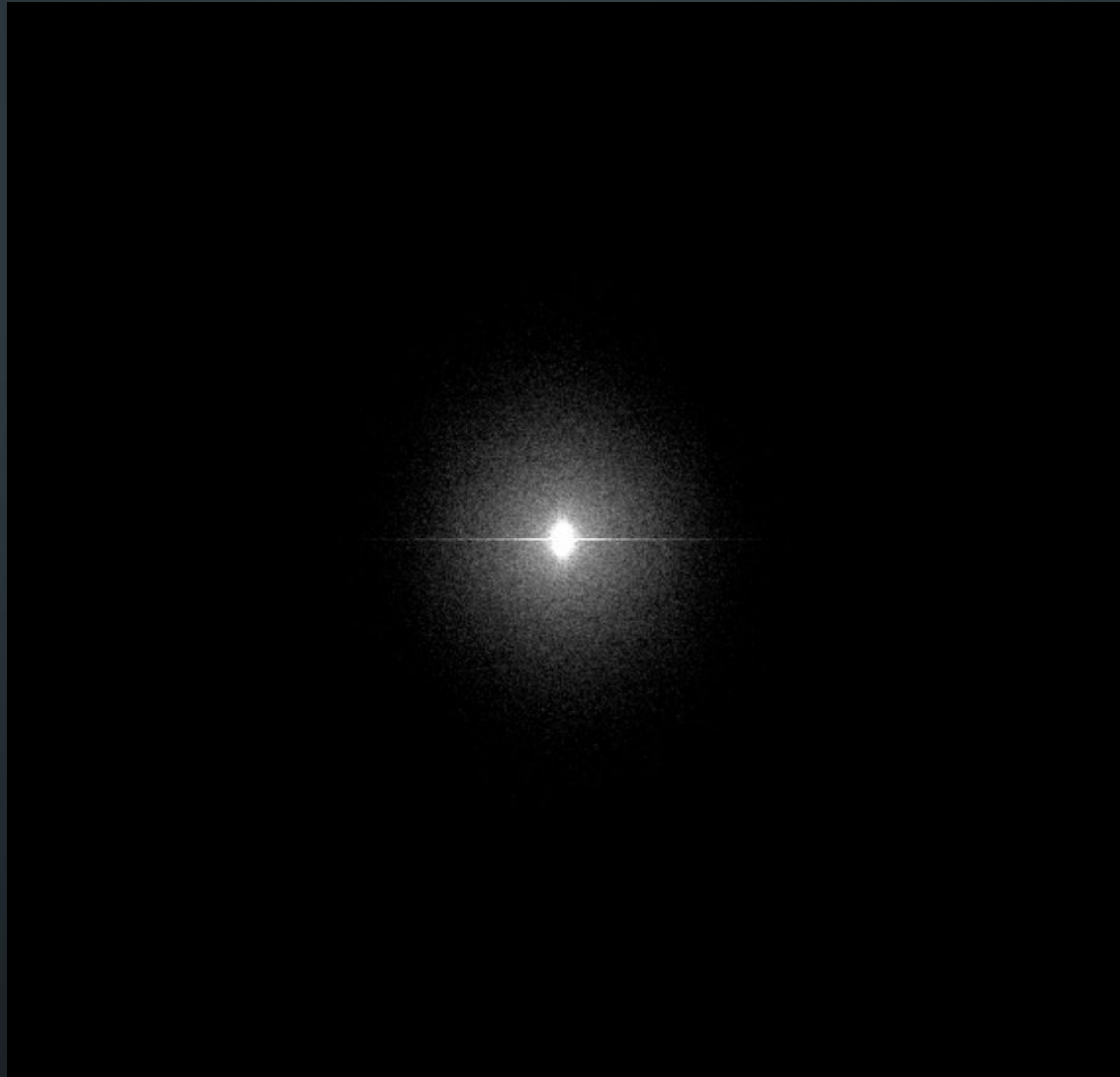
$$\Delta C = 0.14^m$$

A(G2V) -> 2.2 R Jup?

KPS-TF3-663



KPS-TF3-663



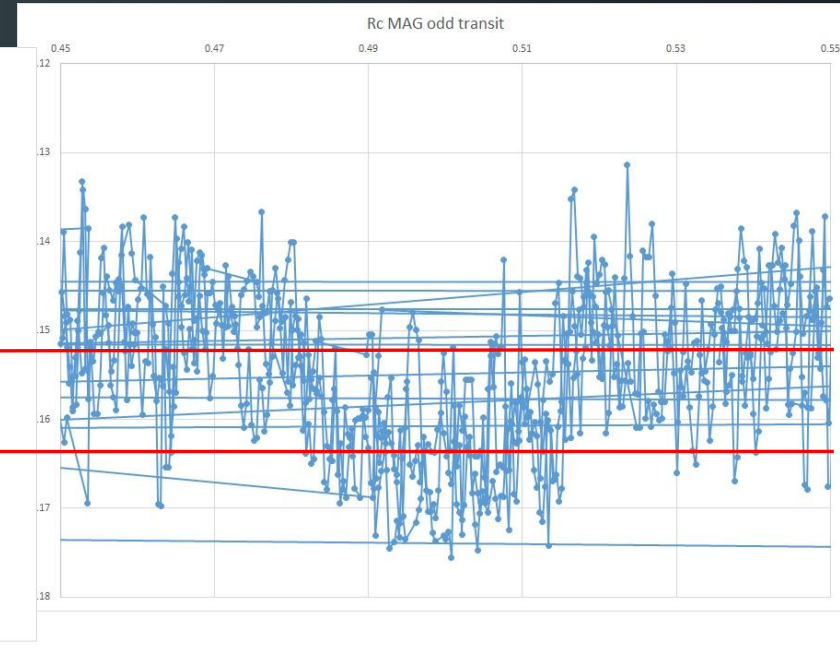
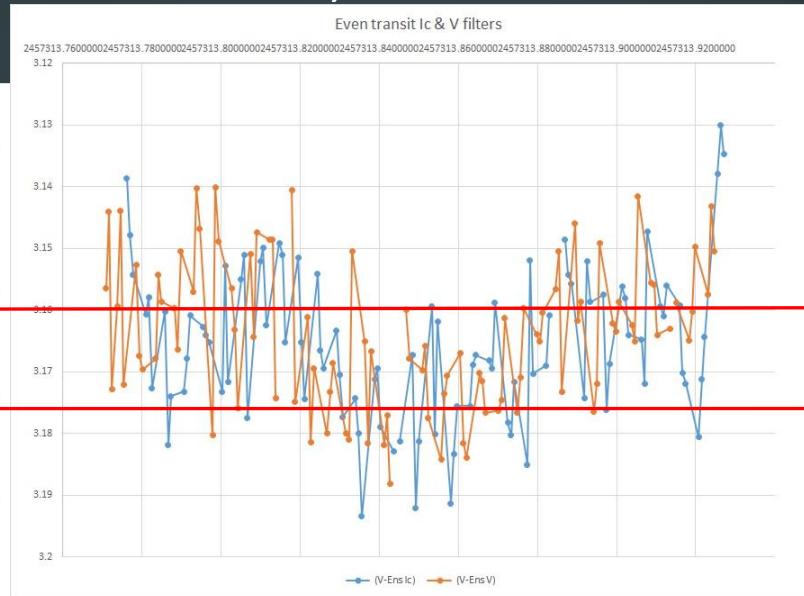
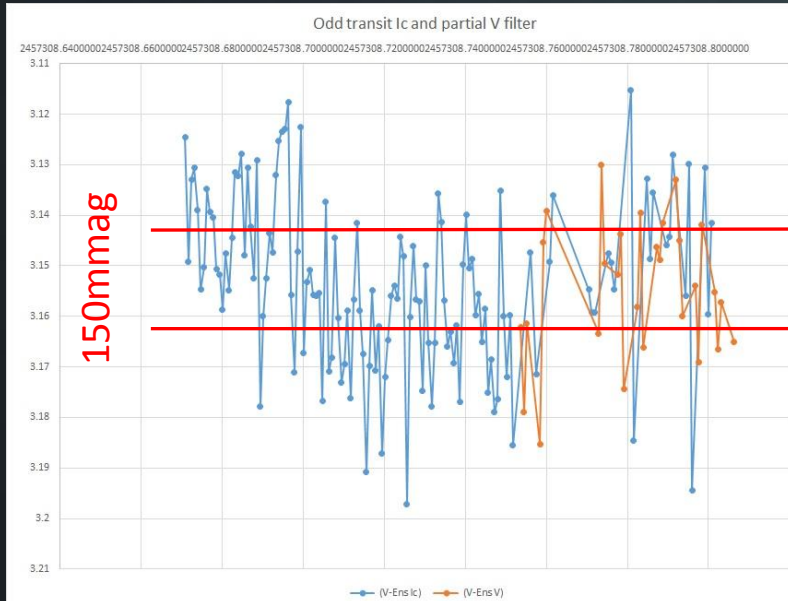
speckle interferometry of the SAO RAS 6-meter BTA telescope

KPS-TF3-663

Rc, odd transit,
phase folded

Ic&V, odd transit

Ic&V, even transit



Benni P. (Acton Sky Portal)

KPS-TF3-663

- no visual companion (speckle interferometer of the SAO RAS 6-meter BTA telescope);
- no secondary minimum;
- late spectral type G2-K1 (MASTER-U photometry+2MASS);
- application for observations using SOPHIE echelle spectrograph;

New observing mode

