

Workshop RoPACS

November 28-2011, Madrid-Spain

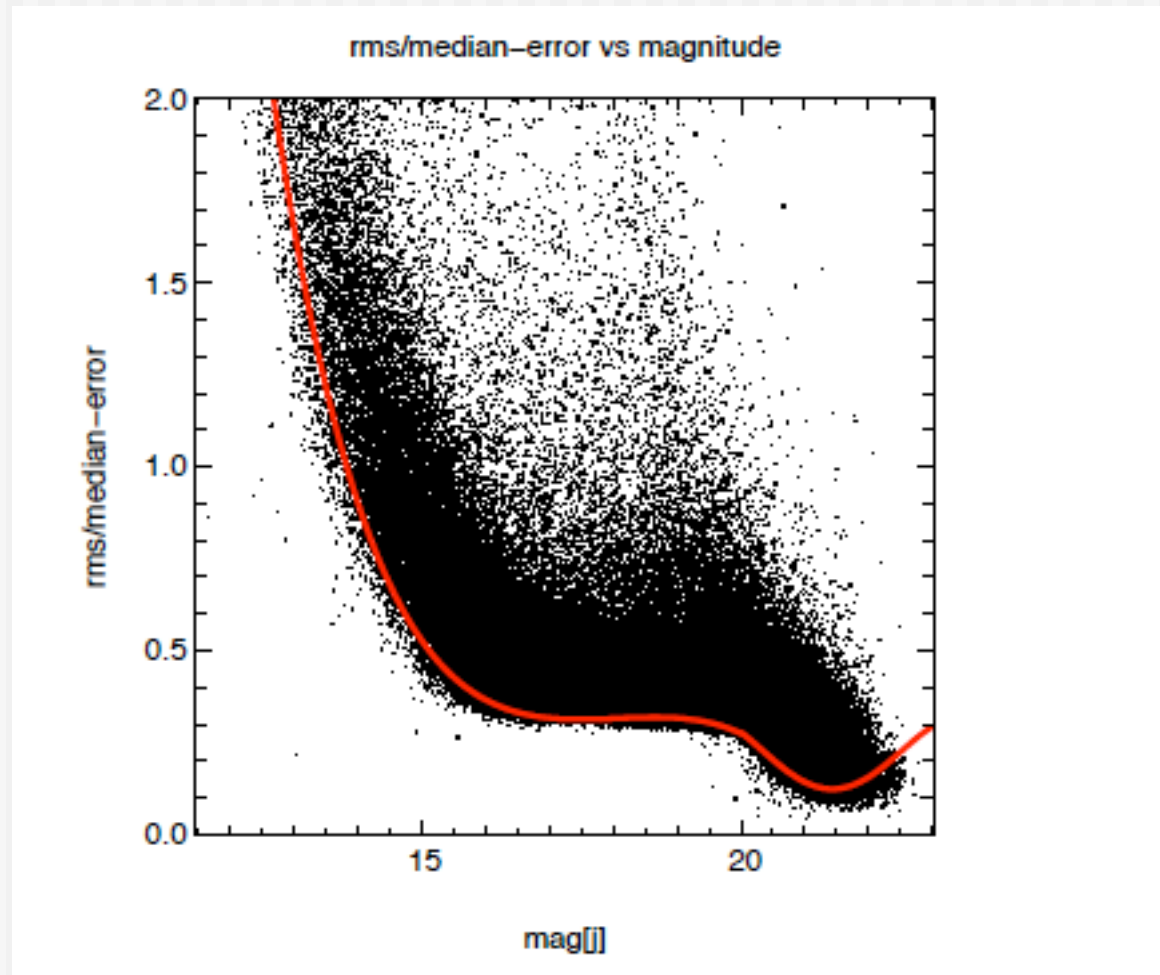
Updates on the DI analysis of
the WTS 19hrs field

ESR Jesús Zendejas Domínguez

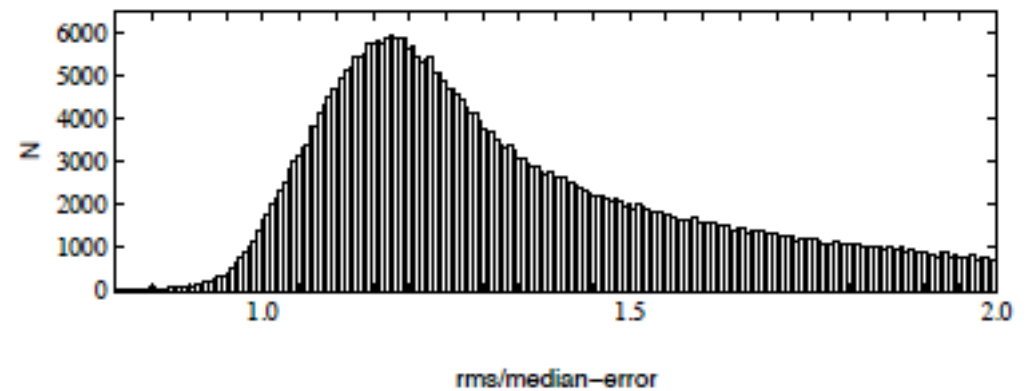
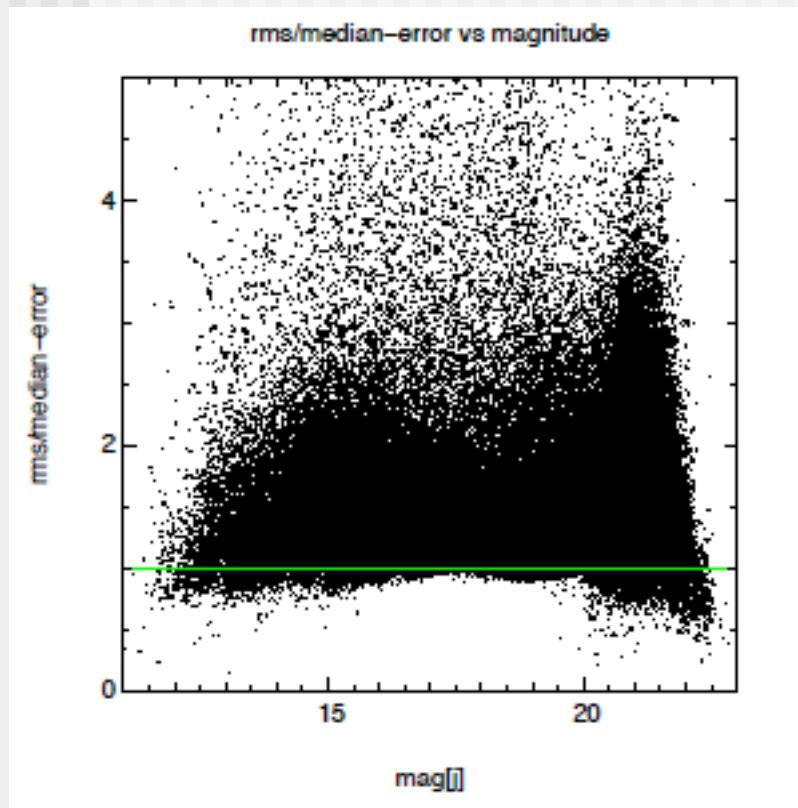
Outline

- Error bars corrections on light curves
- Previous candidate list & selection criteria
- New criteria selection & latest candidate update
- Conclusions
- Ongoing work

Error bars underestimated

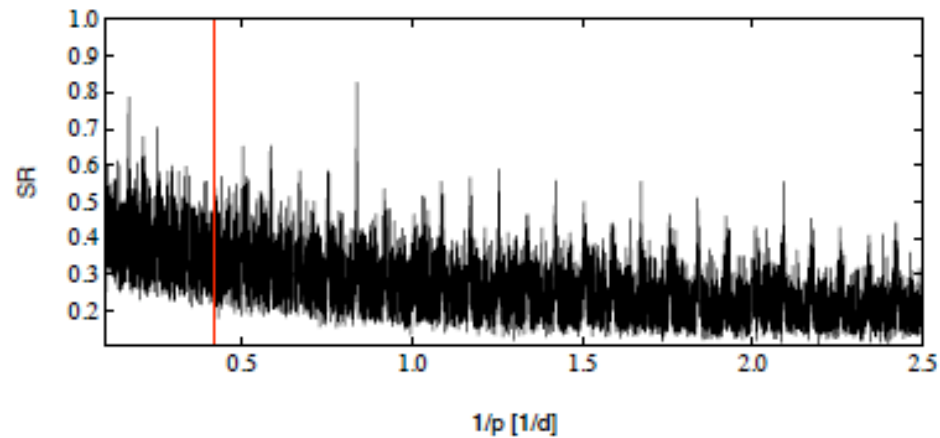
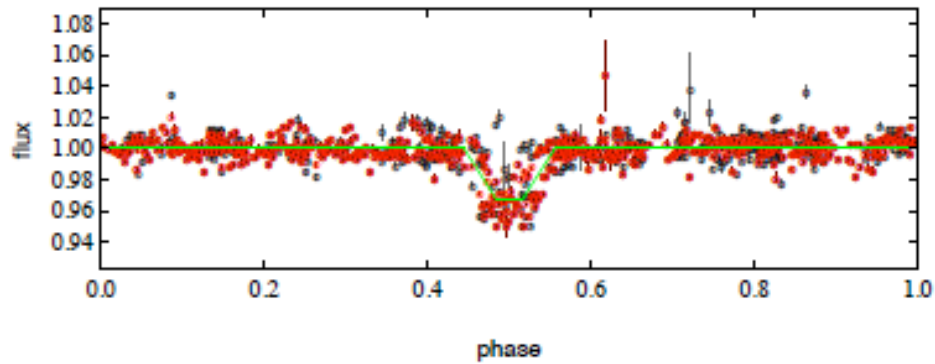


Corrected error bars



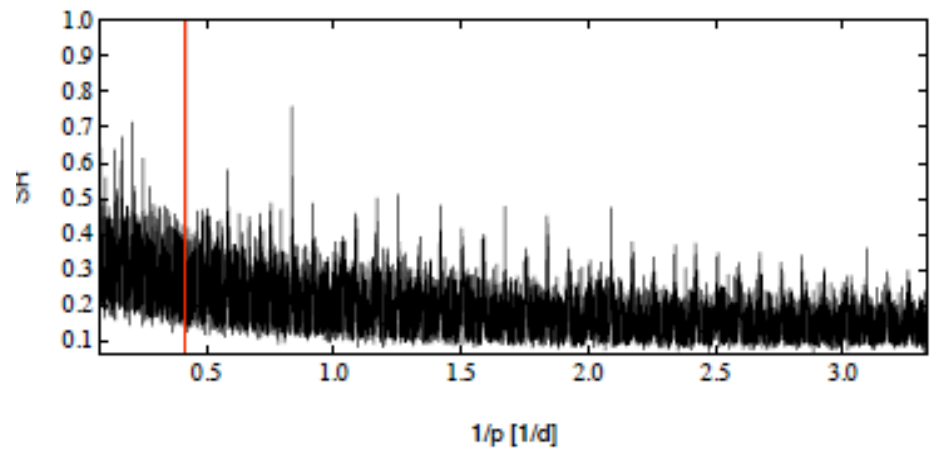
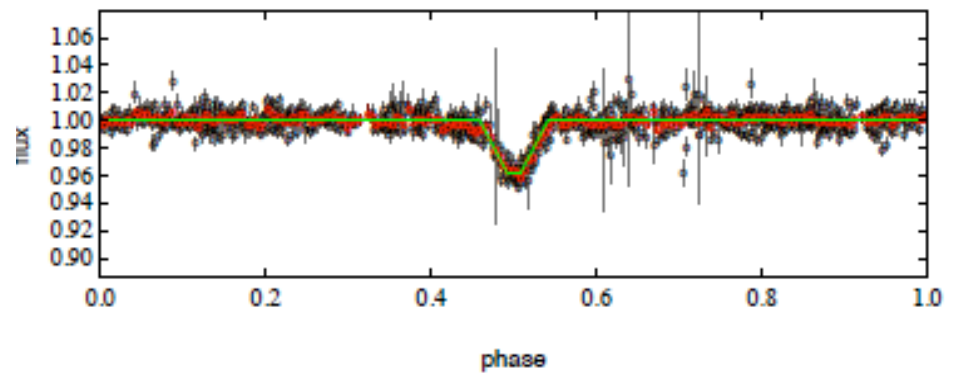
Before correction

No. : 1 SDE = 11.01 $p = 2.39$ $q = 0.07202$ $v = 0.5724$ $v_{\text{drop}} = 0.03411$

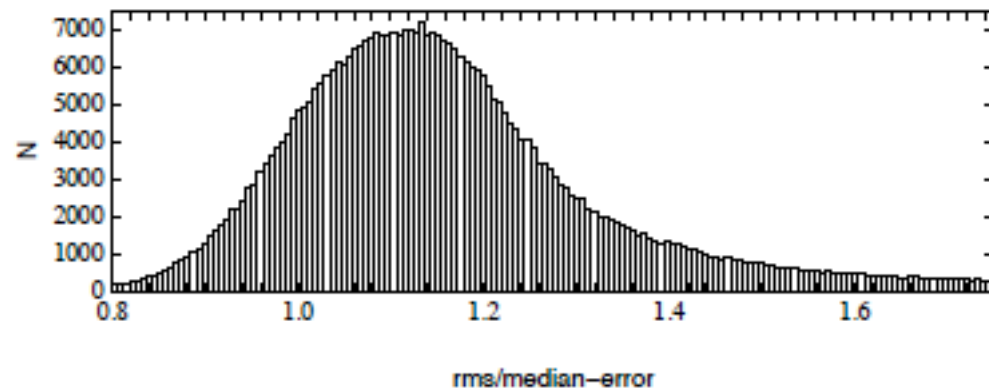
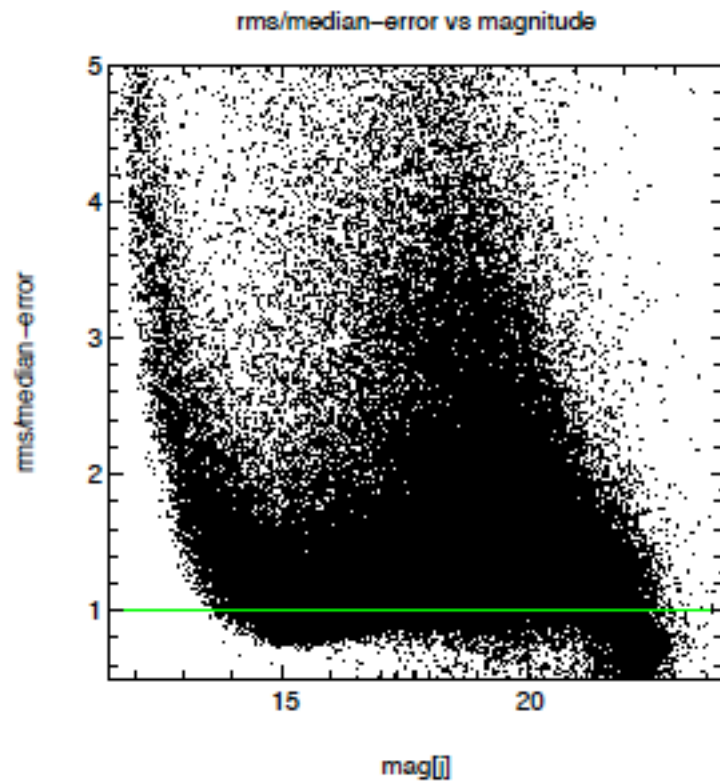


After correction

No. : 1 SDE = 15.9 $p = 2.391$ $q = 0.04913$ $v = 0.6963$ $v_{\text{drop}} = 0.03936$



Aperture Photometry Light curves



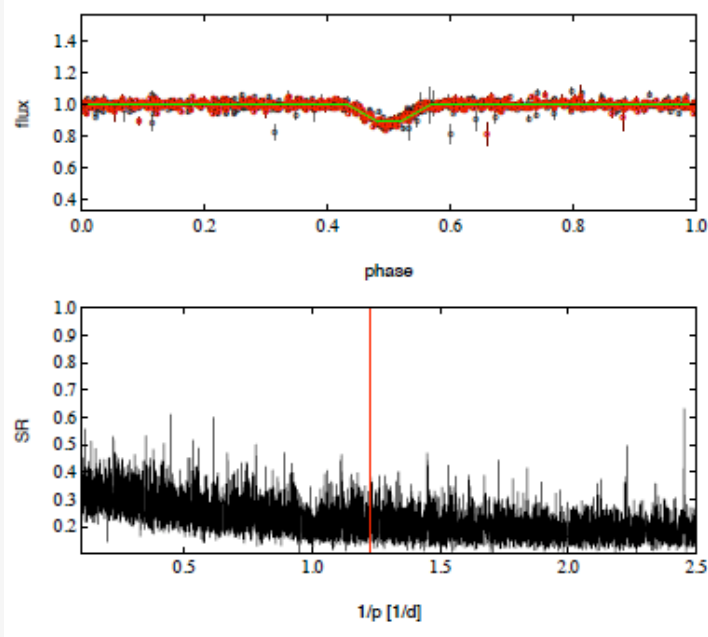
Previous Selection Criteria

- Boxfitting(~500 000 light curves)
- $S_{red}/noise > 5$
- Drop < 10%
- Excluded period 0.5 and 1 day
- $SDE > 6$
- $\chi^2 \leq 5$

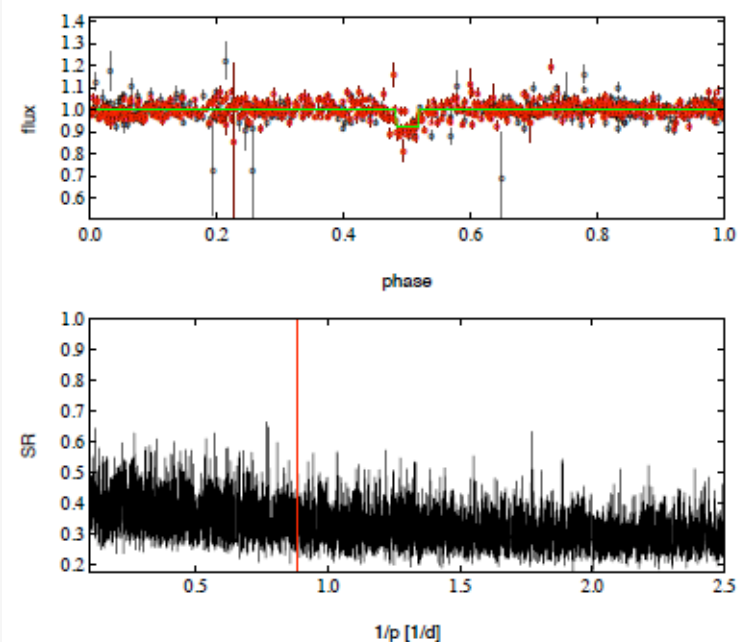
Candidates (Previous results)

- ~ 2180 detections
- Reduced candidates sample(visual inspections): 15 candidates & EB
- Number of common candidates: 1

19d1_09992



19g4_13189



Comparison DI and AP candidates

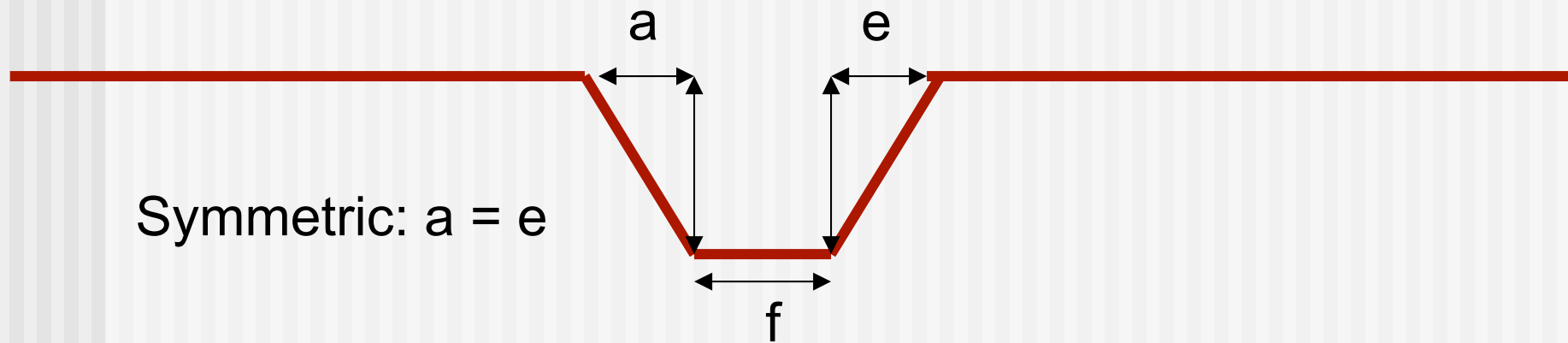
Candidates WTS 19hrs candidate list(DI):~2100→15

| id | mag | sred |
|------------|---------|-------------|
| 19a1_02980 | 15.4809 | 15.465 * B2 |
| 19c2_06957 | 17.7164 | 10.5290 |
| 19b2_01819 | 15.3745 | 6.7704 |
| 19d4_08996 | 16.5455 | 6.7878 |
| 19d1_09992 | 18.0534 | 9.5283 |
| 19d1_14421 | 17.7675 | 5.6191 |
| 19d4_05529 | 17.2719 | 24.7690 |
| 19e2_02057 | 17.1881 | 5.6433 |
| 19e3_06726 | 17.3896 | 9.3805 |
| 19f2_08280 | 18.0381 | 7.7396 |
| 19f3_07058 | 17.5912 | 7.6283 |
| 19f3_01110 | 17.2071 | 20.1820 |
| 19g2_07080 | 17.6048 | 7.2841 |
| 19g4_13189 | 17.8958 | 8.0370 |
| 19h4_08435 | 17.4176 | 9.3048 |

New criteria selection

- Boxfitting \rightarrow magnitude ≤ 17
- Excluded periods $\sim 0.5 / 1 / 2 / 3$ days
- Drop ≤ 0.1
- S/N ≥ 20
- S/N-S/N_removed ≥ 8
- No. transit point ≥ 20
- $\chi^2 \leq 3.5$
- V-shape ≤ 0.75

V-shape parameter



Symmetric: $a = e$

$$V = \frac{a + e}{f + a + e}$$

Planet



$V \sim 0$

EB



$f = 0 \Rightarrow V = 1$

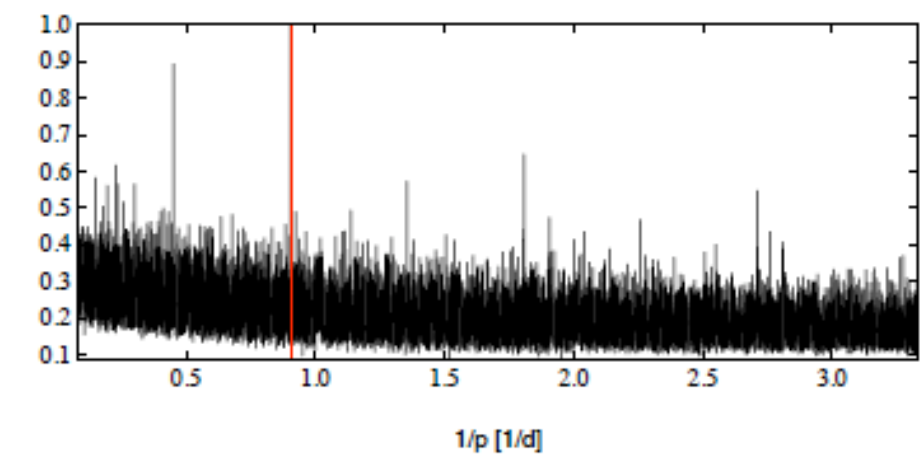
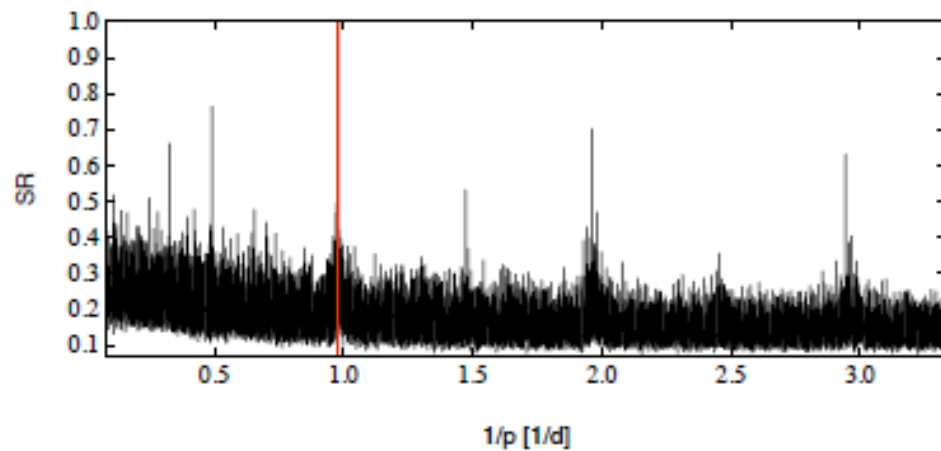
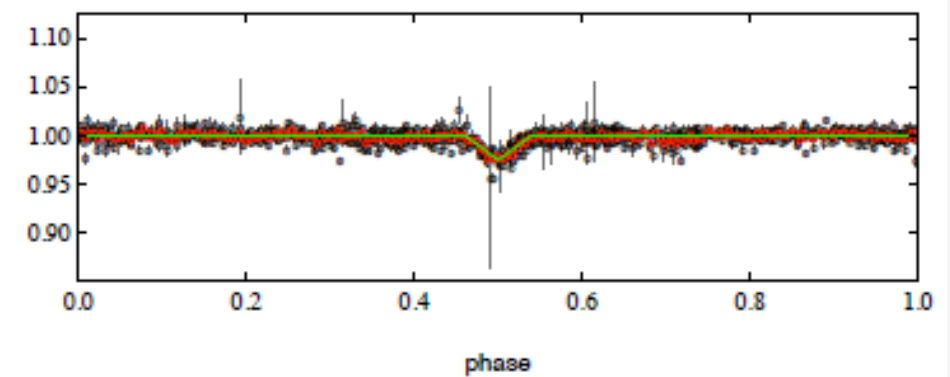
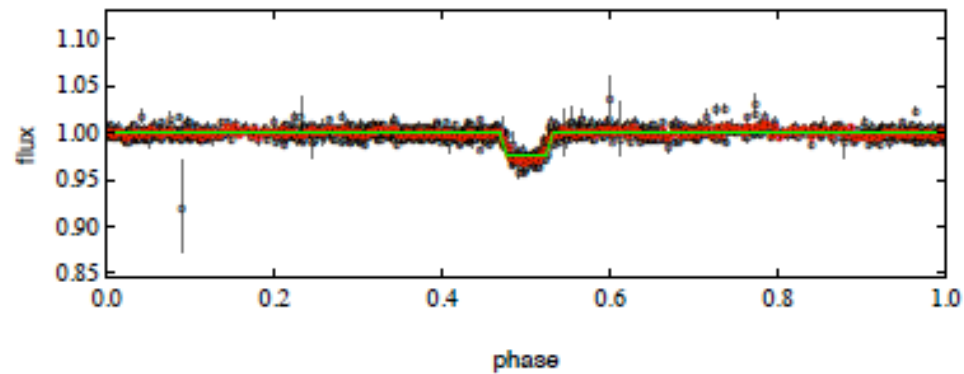
Examples of V-shape parameter

Planet

EB

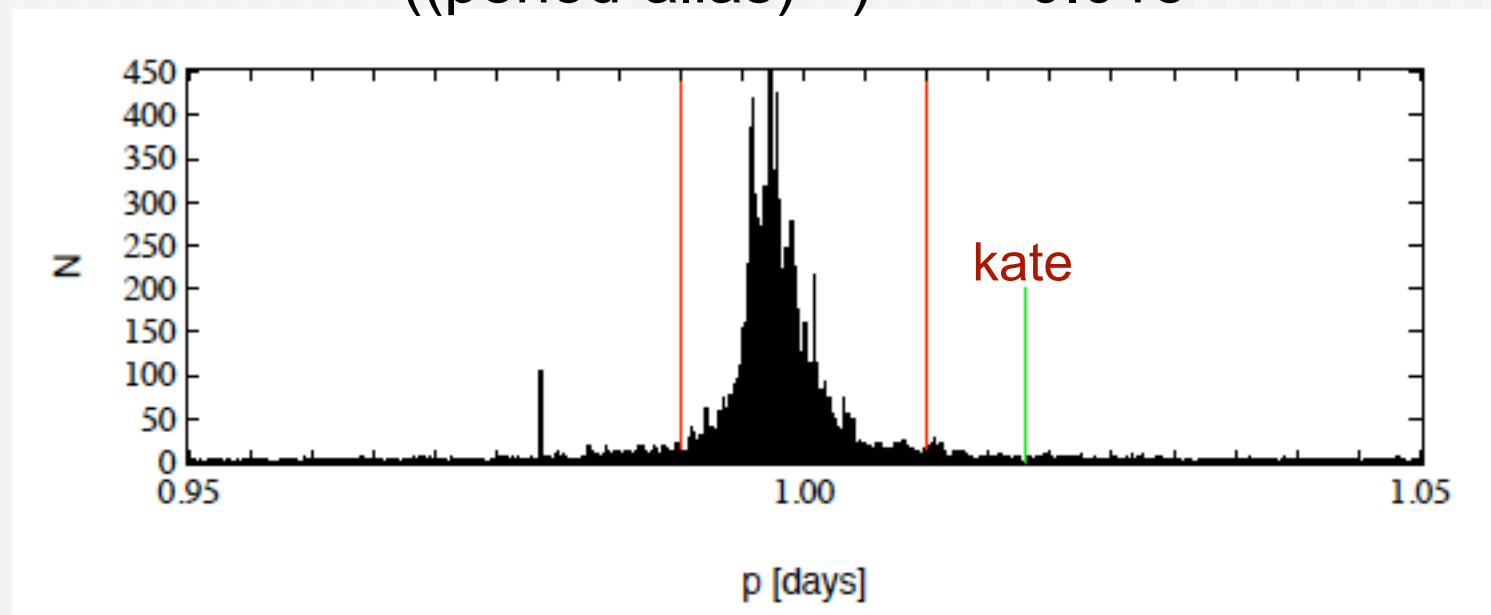
No. : 14 SDE = 22.75 $p = 1.019$ $q = 0.05497$ $v = 0.1698$ $V_{\text{drop}} = 0.0258$

No. : 1 SDE = 19.27 $p = 1.107$ $q = 0.03966$ $v = 0.981$ $V_{\text{drop}} = 0.02493$



Aliases: $\sim 0.5/1/2/3$ days

$$((\text{period}-\text{alias})^2)^{1/2} > 0.015$$



Results

After cutting our sample to objects with magnitudes below 17, the number of light curves was reduced to 55704.

Criteria selection: 45 objects

Visual inspection: 20 objects

Common candidates: 4(Kate)

| | | |
|------|---|-----------------|
| P1 : | 1 | |
| P2 : | 7 | } Spectral type |
| P3: | 4 | |
| B: | 8 | |

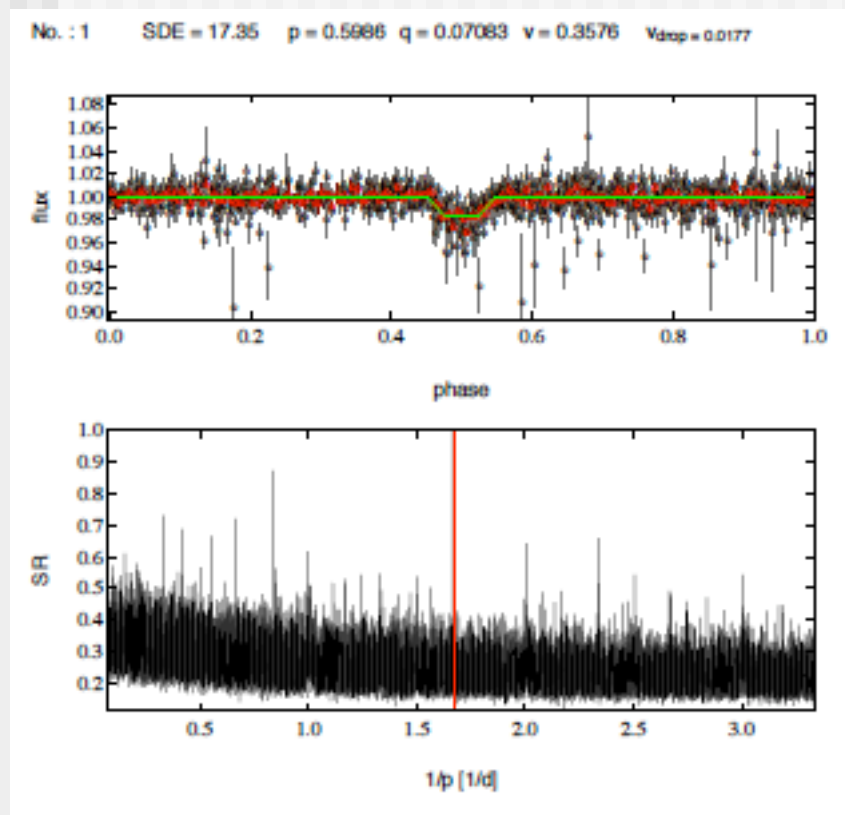
Quick view of Tracker Candidates by our Selection Criteria

| id | p | drop | v | T.P | S/N | SN-SNR | χ^2 |
|------------|---------|-------|-------|-----|--------|--------|----------|
| 19c4_06396 | 1.01871 | 0.025 | 0.169 | 80 | 64.955 | 49.45 | 3.1311 |
| 19d1_09358 | 3.35173 | 0.015 | 0.256 | 19 | 14.975 | 3.16 | 2.0391 |
| 19e3_09693 | 2.12273 | 0.014 | 0.700 | 41 | 13.763 | 3.63 | 1.5528 |
| 19a1_03509 | 0.99708 | 0.004 | 0.235 | 316 | 15.288 | 4.40 | 1.6261 |
| 19b1_02311 | 8.48080 | 0.007 | 0.359 | 64 | 15.383 | 2.82 | 2.4063 |
| 19b3_12548 | 3.67564 | 0.007 | 0.481 | 41 | 13.763 | 1.00 | 2.9278 |
| 19c3_13505 | 1.99216 | 0.007 | 0.030 | 55 | 10.973 | 2.06 | 2.0045 |
| 19d2_12626 | 0.99650 | 0.012 | 0.300 | 159 | 40.737 | 10.87 | 6.3861 |
| 19e3_12801 | 2.97831 | 0.019 | 0.904 | 15 | 12.348 | 1.30 | 1.6639 |
| 19f2_09237 | 0.99686 | 0.005 | 0.478 | 81 | 14.264 | 0.70 | 2.0315 |

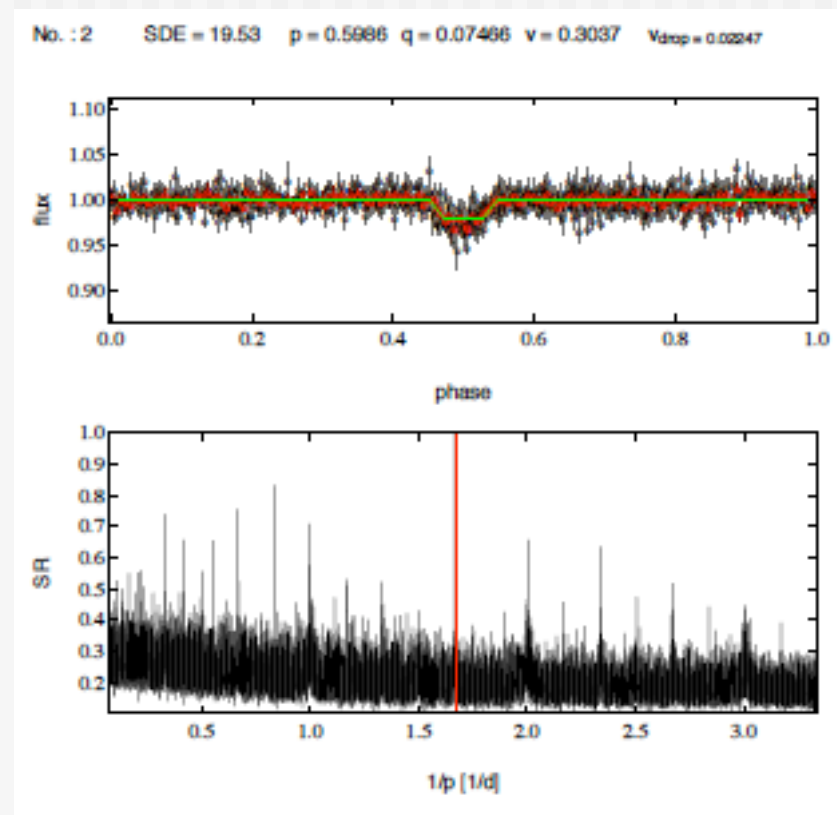
19b1_02162

Period: 0.5986
Drop : 0.0177
Magnitude:15.80

DI



AP



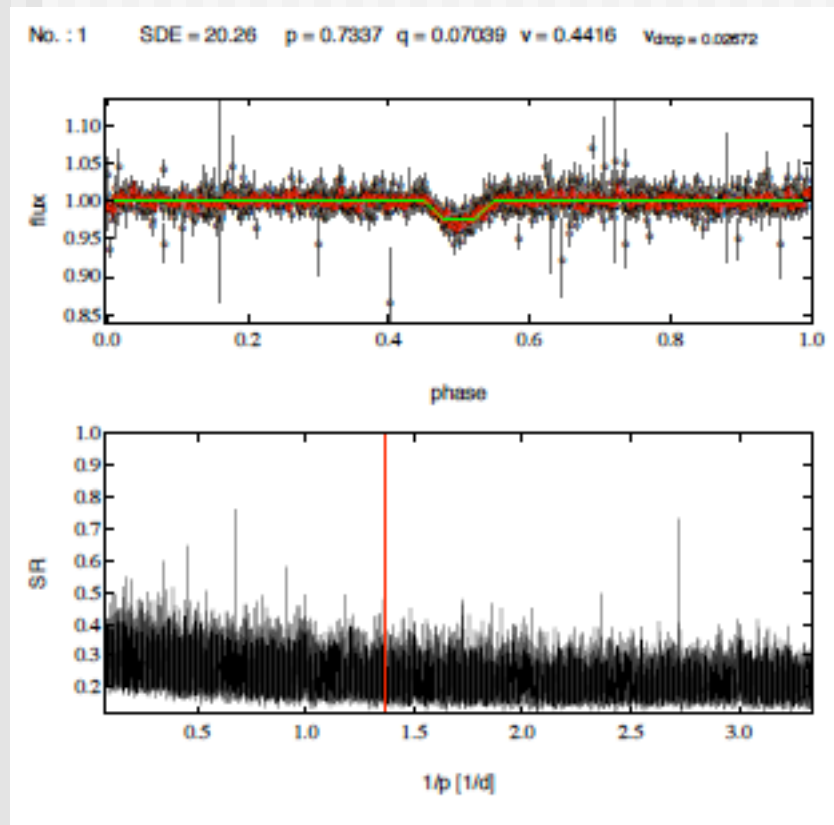
19b3_05398

Period: 0.7337

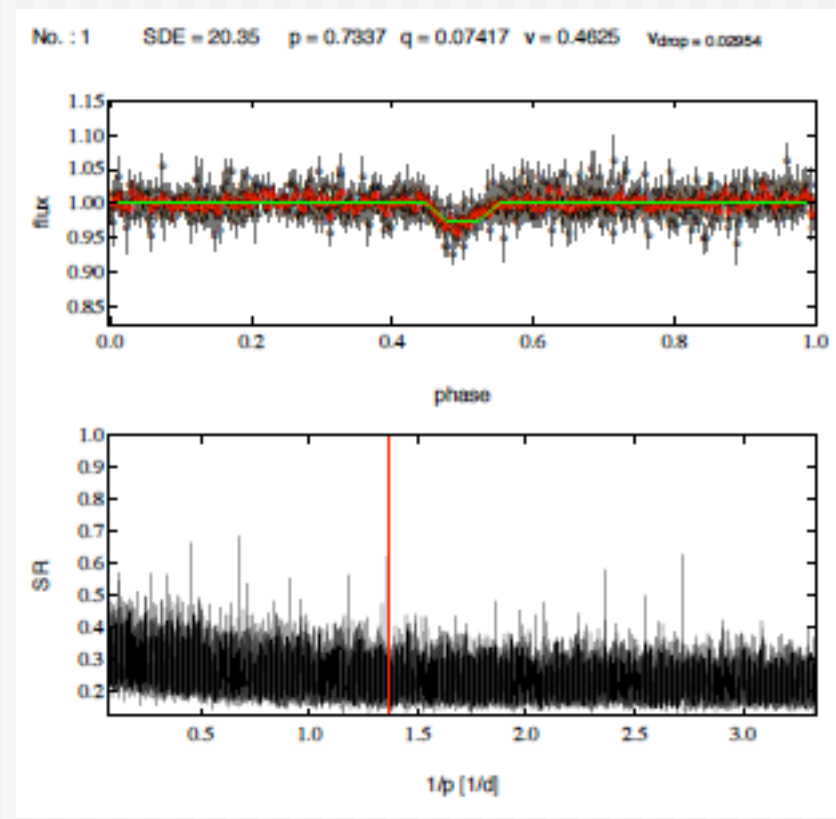
Drop : 0.0207

Magnitude: 16.67

DI



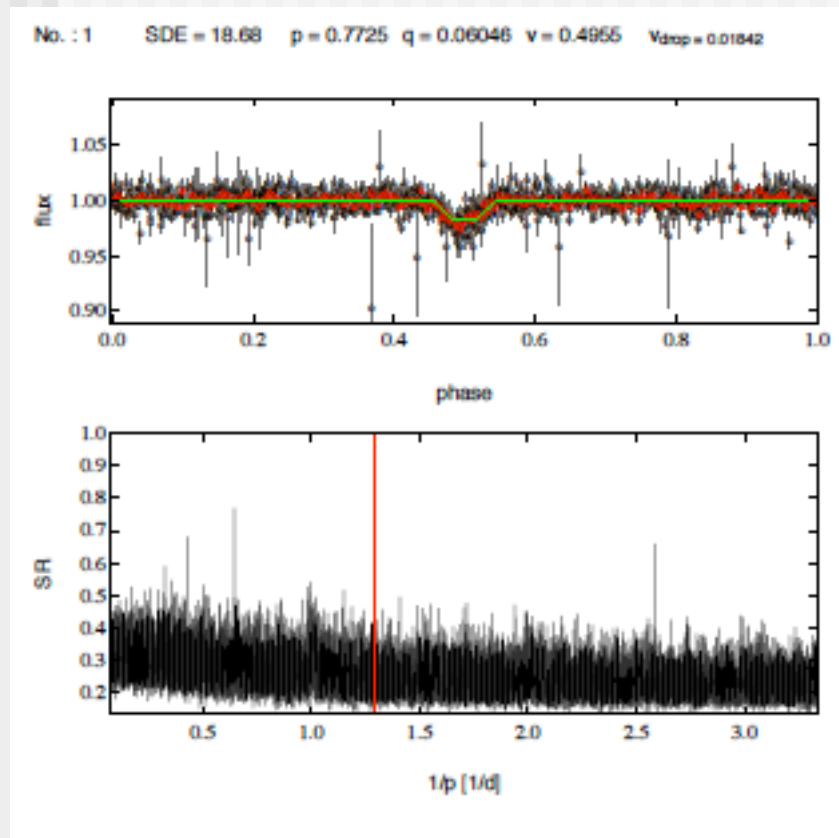
AP



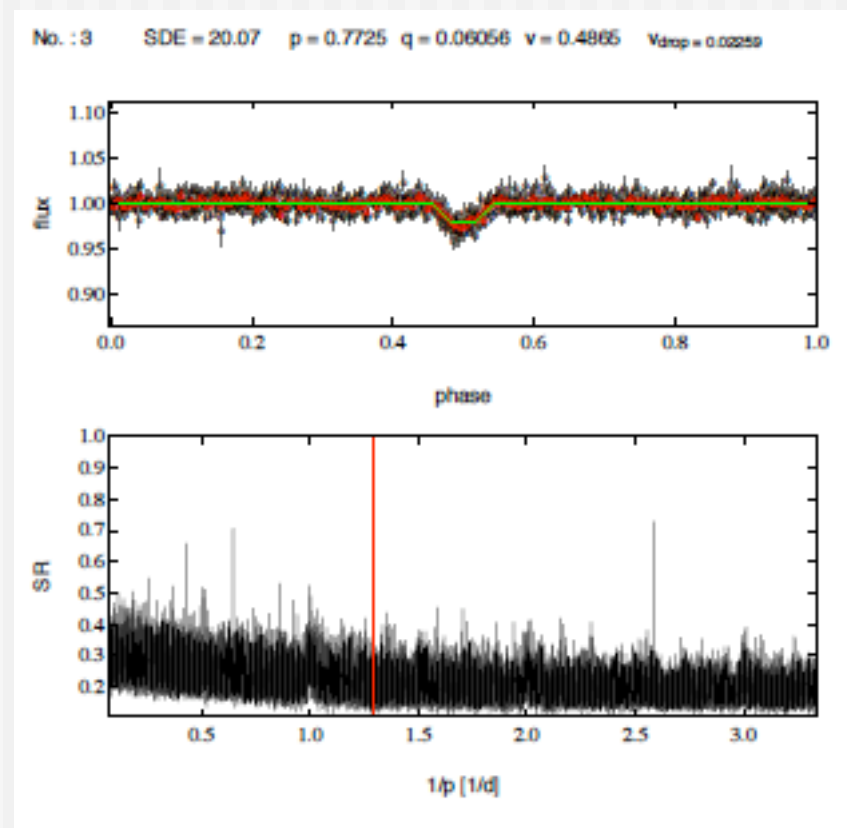
19e1_05755

Period: 0.7725
Drop : 0.01842
Magnitude: 15.33

DI



AP



Conclusions

- New set of Corrected Difference Imaging light curves are available to be released.
- Finally! A concrete candidate list from DI light curves is ready to be released in the track.
- We have found a clear method of detections which is able to reproduce some candidates on the track (Kate) and provides new candidates.

Ongoing and future work

- I am currently writing a paper about DI analysis
- Some our candidates can be followed up during next months
- Fix error bars on AP light curves and run Boxfitting?

That's all....Thank you!