Afternoon RoPACS meeting
Sep 8/2010, Lisbon

Latest report of WTS release 1.0 and final results on the improvements of Difference Imaging analysis

<div align="right">Jesús Zendejas Domínguez</div>

Outline

- Reminder:
    - WTS release 1.0 candidates
    - WTS release 1.0 Munich-Candidates
    - Latest report WTS release 1.0
- Improvements on Difference Imaging analysis
    - First results
    - Latest improvements
- Conclusions
- Ongoing work

WTS Release 1.0 Light curves

Reminder:

Detection & Selection Characteristics:

- 19hrs field (~500 data points)
- Occfit- Transit detection algorithm (Box Least Square)
    i) Periods 0.2-6 days
    ii) J magnitude in the range < 17.0
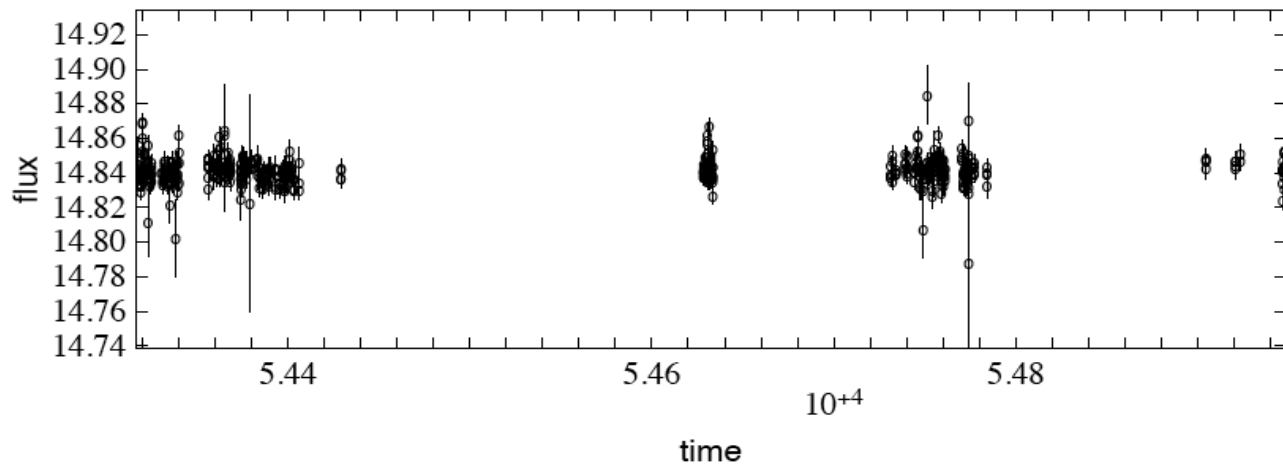
Candidates from WTS release 1.0

- 151 candidates(J_mag~10.9-16.8)

Classification	# Candidates	J mag
P1	1	14.9
P2	10	13.49-16.25
B1	3	15.55-16.23
B2	101	10.94-16.88
W	29	11.63-16.80
V	5	11.92-14.75
S	2	15.35 & 15.53

P-Planets   W-Watch list
B-Binary system   S-Spot
V-Variable, no yet understood

Munich Candidates

- 55 Candidates & EBs, J mag[12.21-17.71]
- Period 0.5-5 days
- Depth < 0.15

Classification	#Candidates	Previously
P1	1	1
P2	9	6
P2-3	4	2
P3	13	6
P3-B	3	1
B	25	9

P1-First priority   P2-3 & P3-B-No clear classification
P2&3-Lower priority   B-EBs

Summary

- 55 candidates & EBs
- 25 candidates were detected previously
- We found 30 new planets, but now I know why:

#Candidates	Explanation
1	Sred noise
15	In field19.60*
9	Too faint(J_mag>17)
3	Morph Class 1
1	Period > 6 days
1	My fault

--> The selection algorithm is fine

Light curves extraction by Difference Imaging

Difference imaging analysis during the last RoPACS meeting….

- 1 Paw-print from 19 hrs field
- ~60 000 light curves were extracted
- Difference imaging produces better quality light curves only for faint stars (J_mag > 16)
- Aperture photometry gives excellent results for stars with J_mag < 16
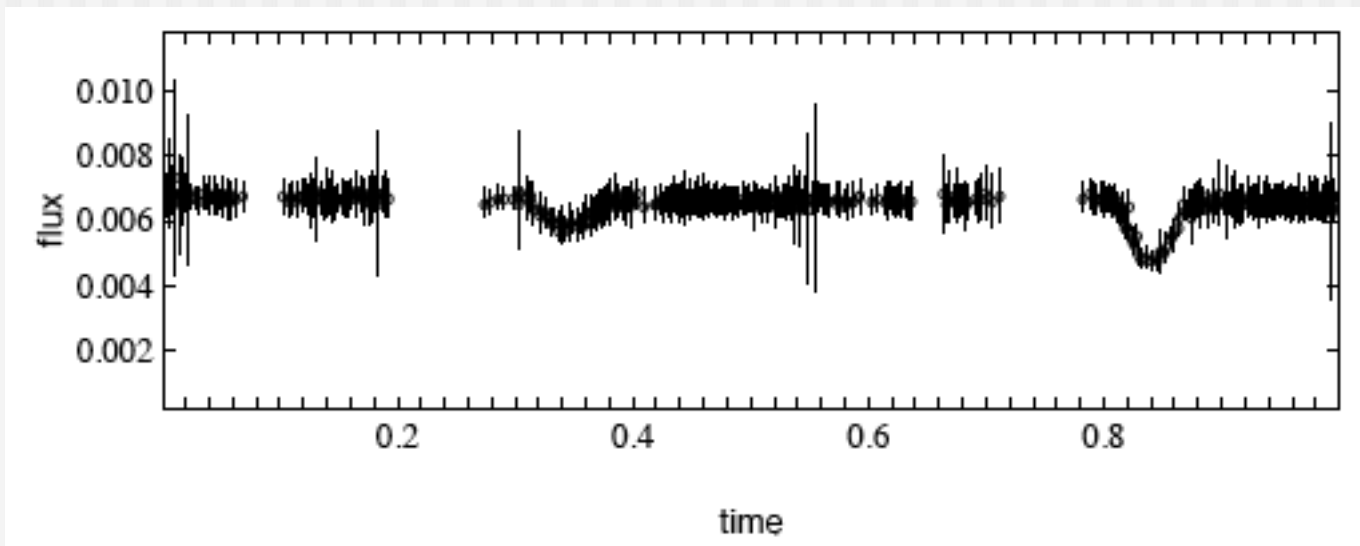
Improvements

- We remove systematic effects(sysrem)
- We Clip data points with $\sigma > 3$
- We planed further tests:
  (a) parameterize global kernel
  (b) box-fitting analysis on the difference imaging light
curves
Carried out two additional tests:
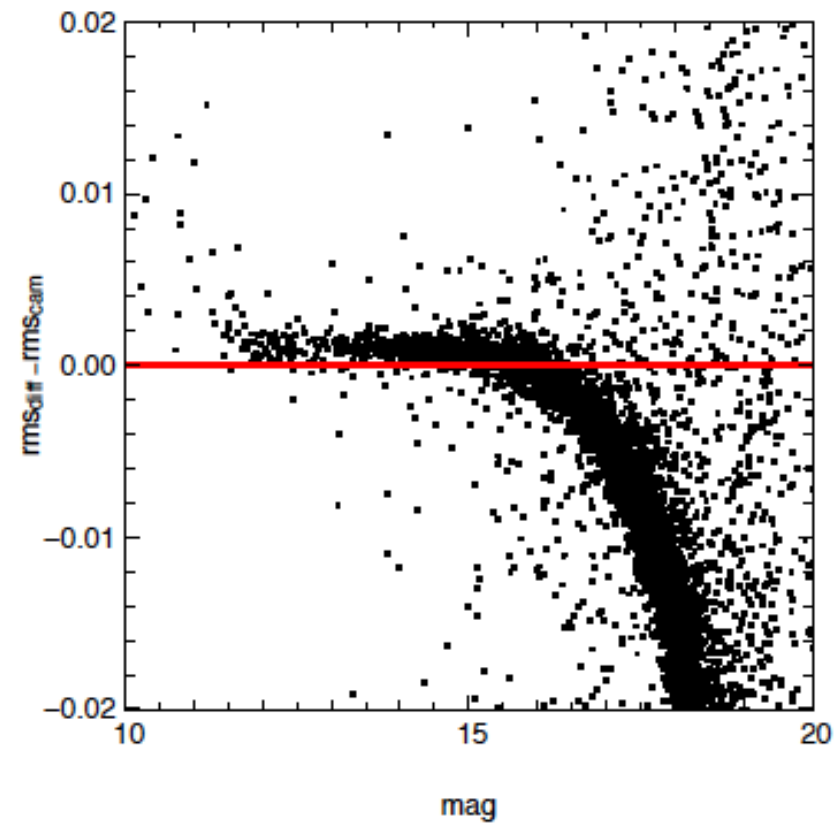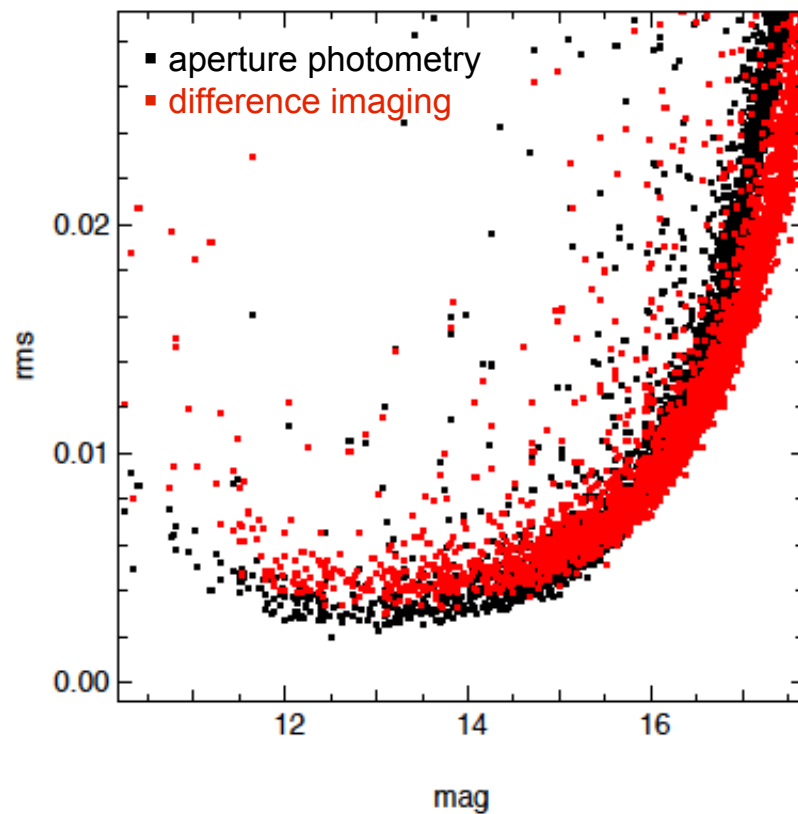 (c) Mask for bright stars.
  (d) Background corrections

RMS$_{Diff}$ -RMS$_{Phot}$ vs. Magnitude
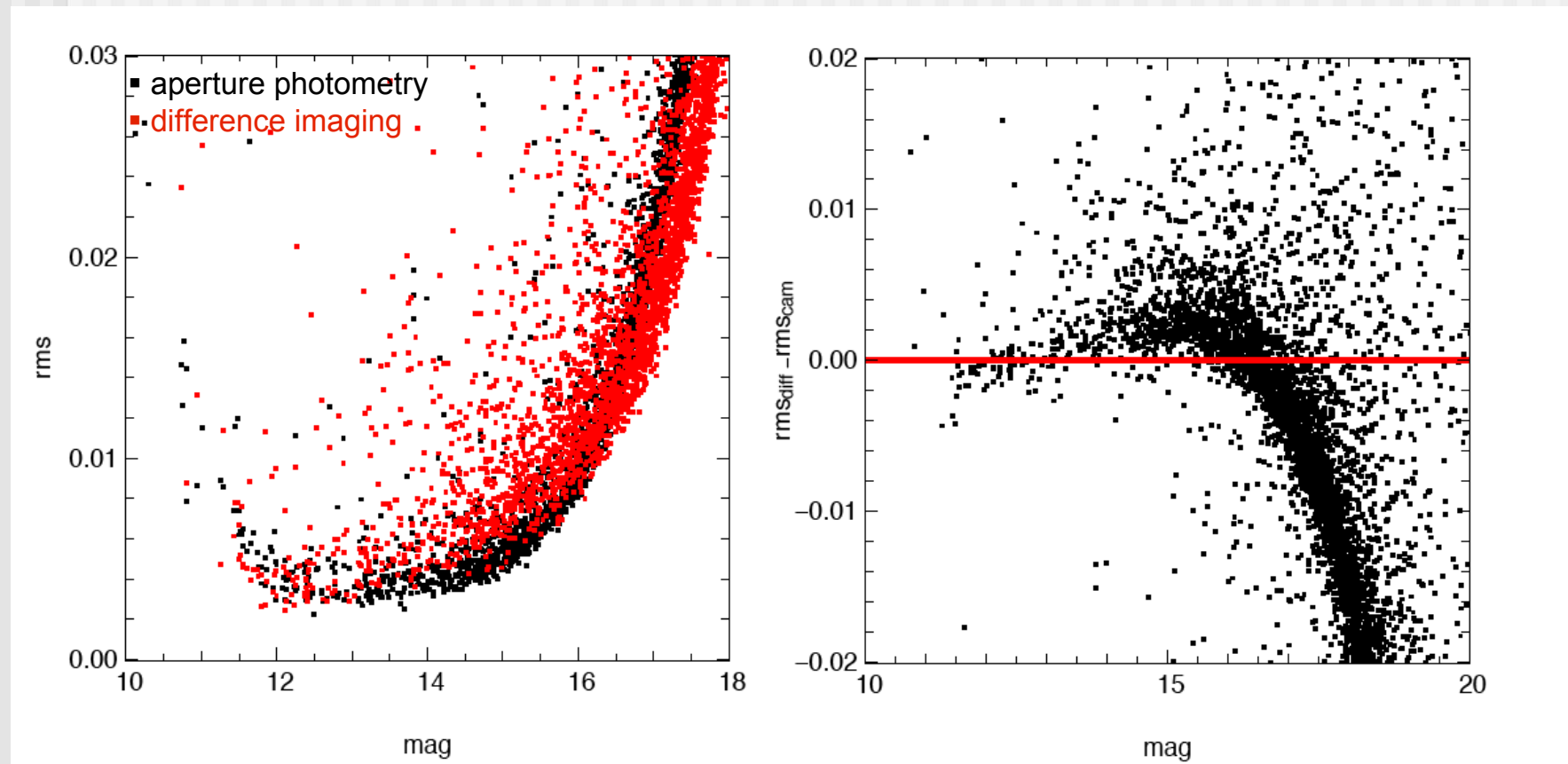
RMS~Diff~ -RMS~Phot~ vs. Magnitude(sysrem)
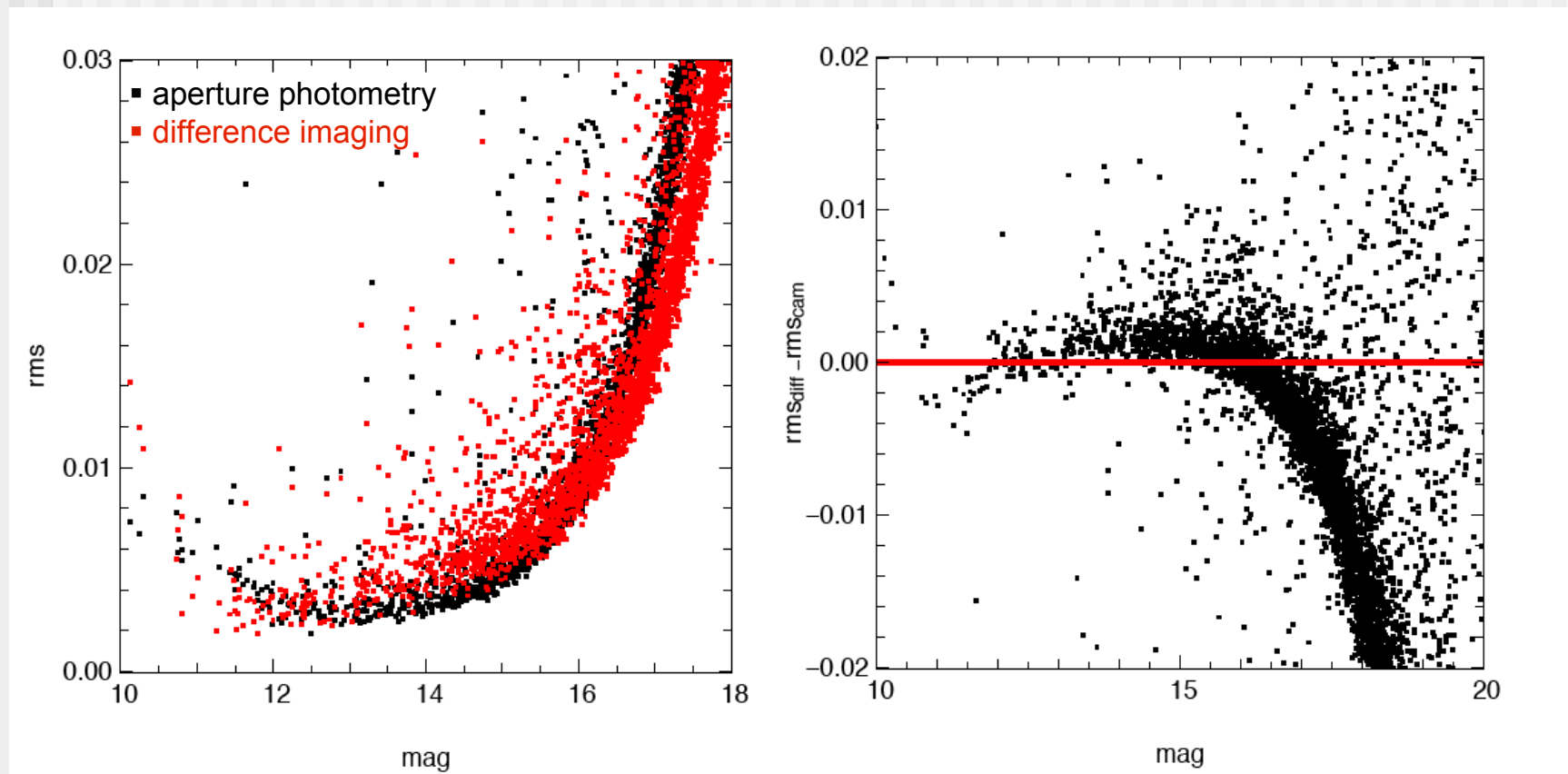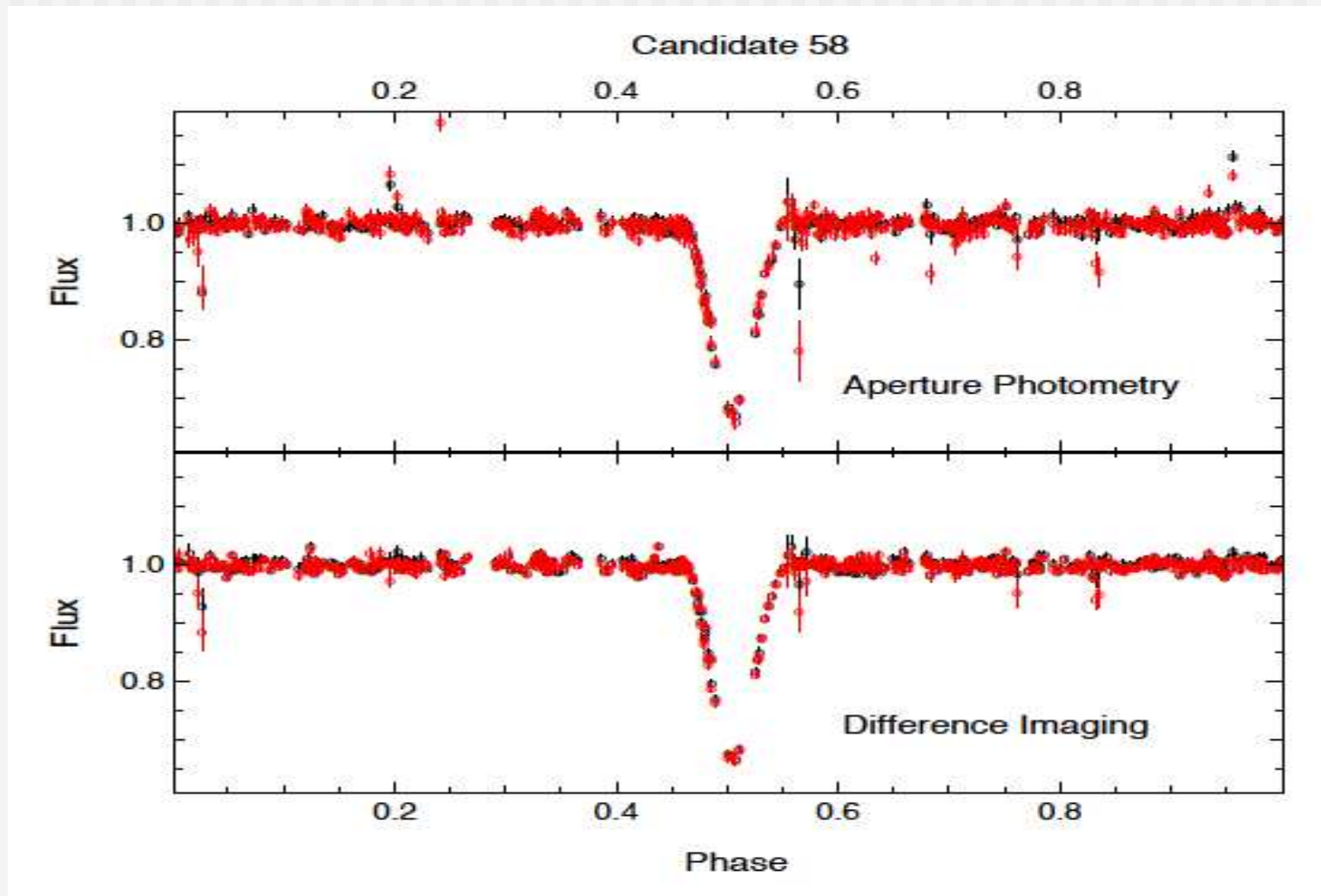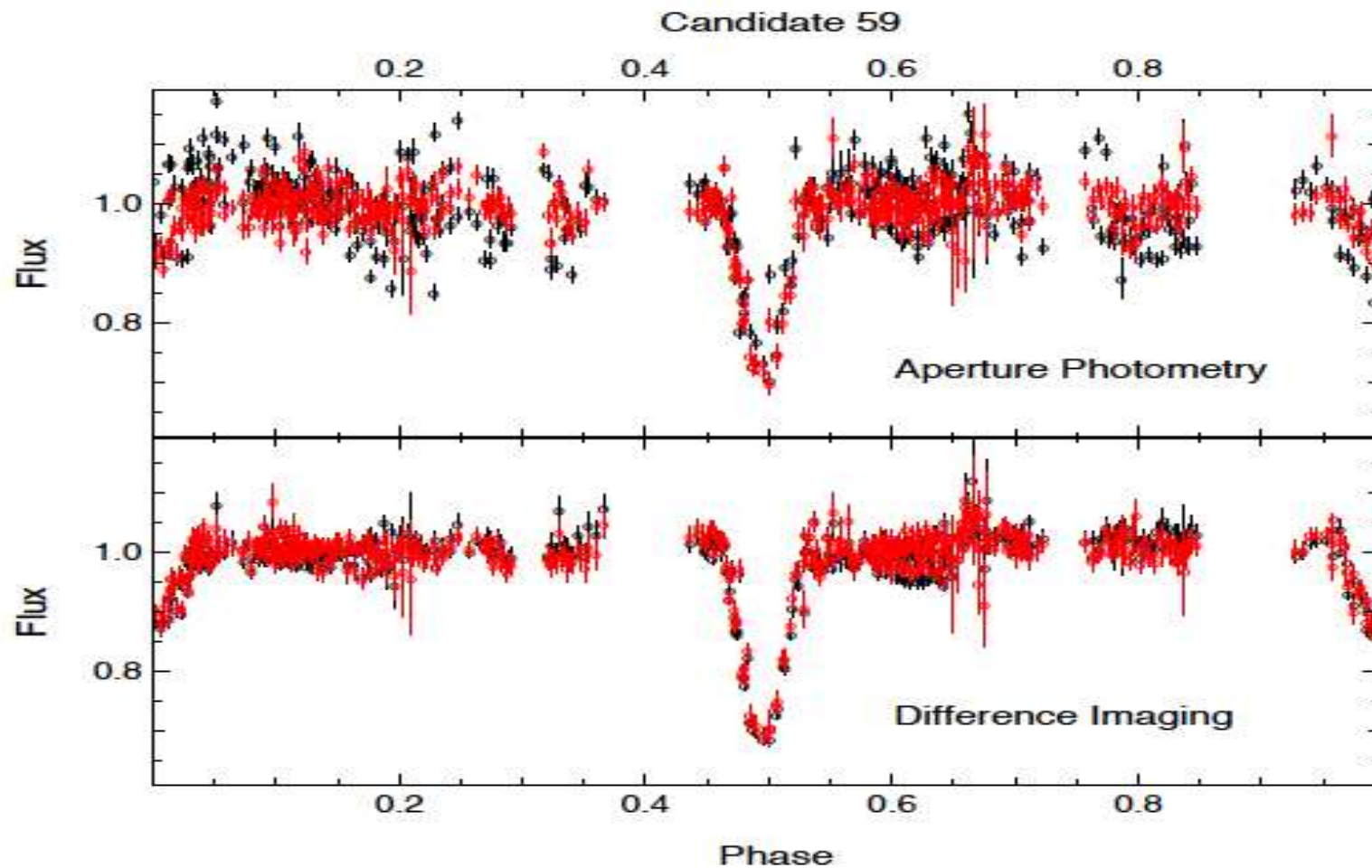
Final results for the improvements of Difference Imaging analysis

Bright stars (J_mag = 15.429)

Faint Stars (J_mag = 16.505)

Conclusions

- Aperture photometry continues to be better for bright stars.

- However, we achieved a significant improvement of difference imaging, producing higher quality light curves for stars with J_mag >~16.

- As I mentioned at the last RoPACS meeting, difference imaging could be very successful to study variable stars and transits around faint stars (J_mag > 16).

Ongoing and future work

- I am currently working in the extraction and fitting of light curves by difference imaging analysis of the whole 19hrs field in order to create a candidate list based on DI.

- We are planning for the next months to carry out the same analysis for the 3, 7 &17hrs fields.

Additional activities:

Astrobiology Graduate Conference 2010 (14-18 June 2010)

Observing training time in Tenerife (August 2010)