OGLE

Nuclear Transients in Gaia and OGLE

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Gaia alerts meeting 2016, Utrecht - 7-9 December

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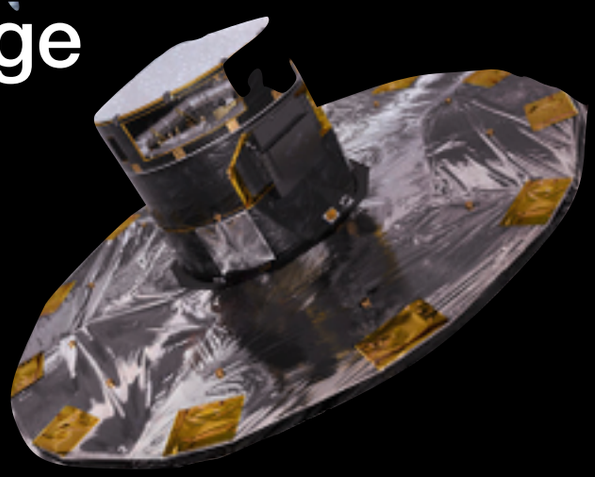
OGLE team in Warsaw

Gaia DPAC



OGLE and Gaia hunt for TDEs

OGLE

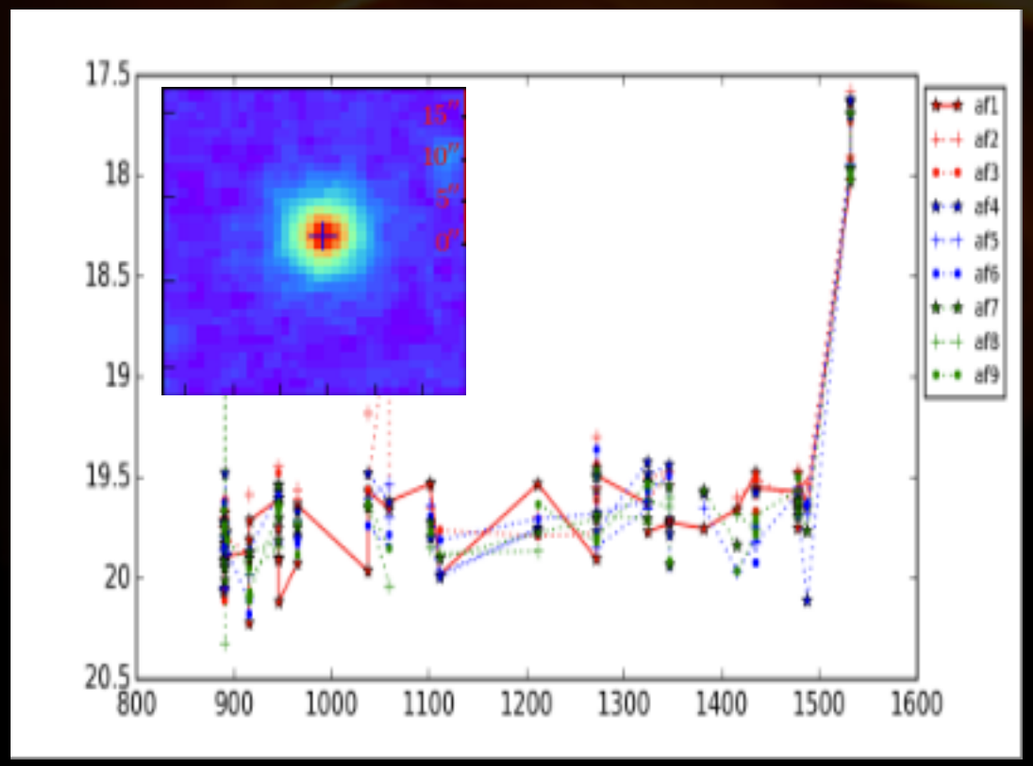
Polish 1.3m dedicated telescope
in Las Campanas, Chile
Surveying continuously since 1992.

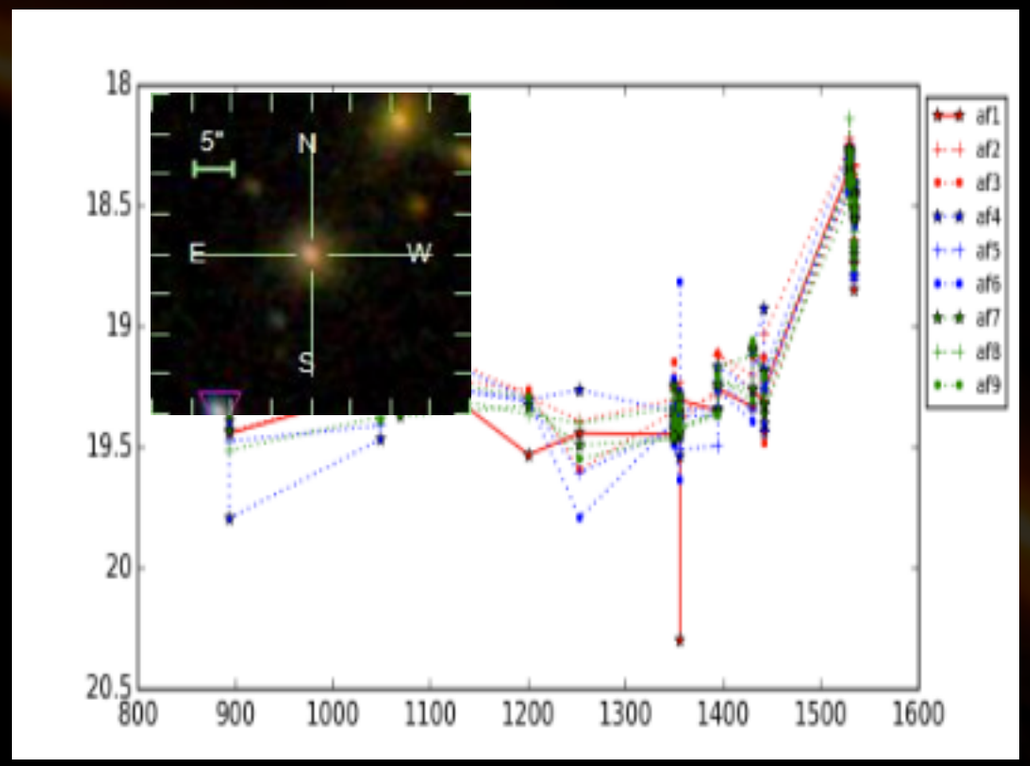
Gaia Science Alerts

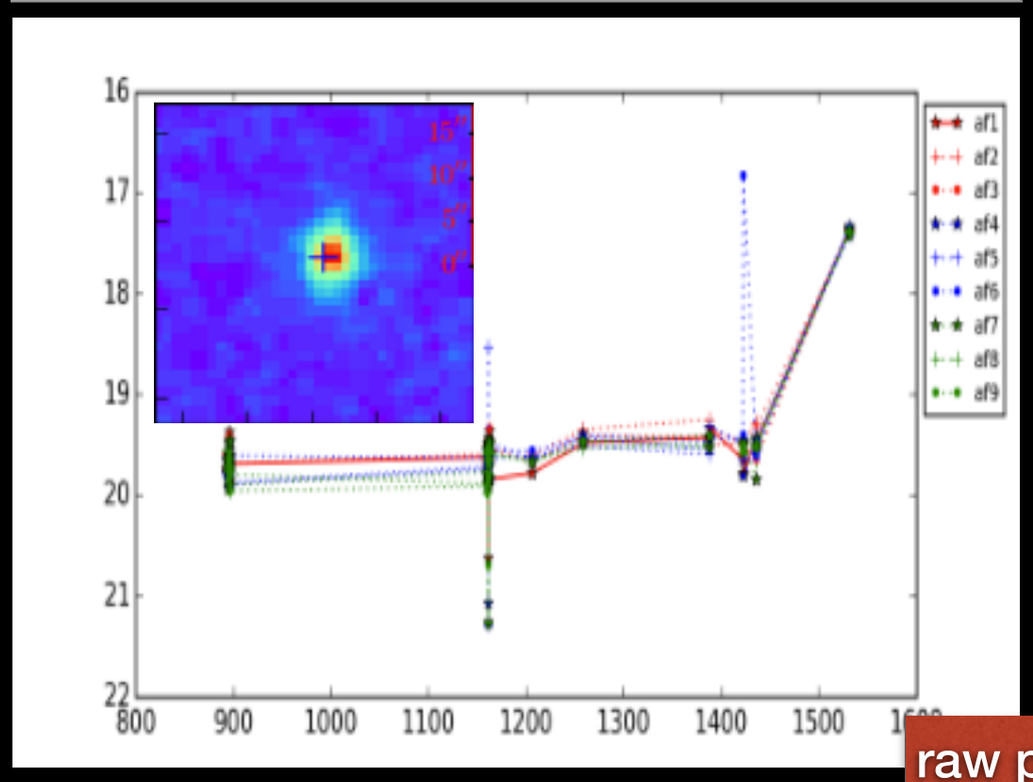
ESA space mission with 2x1.4m telescopes located in L2.
In operation since 2014.

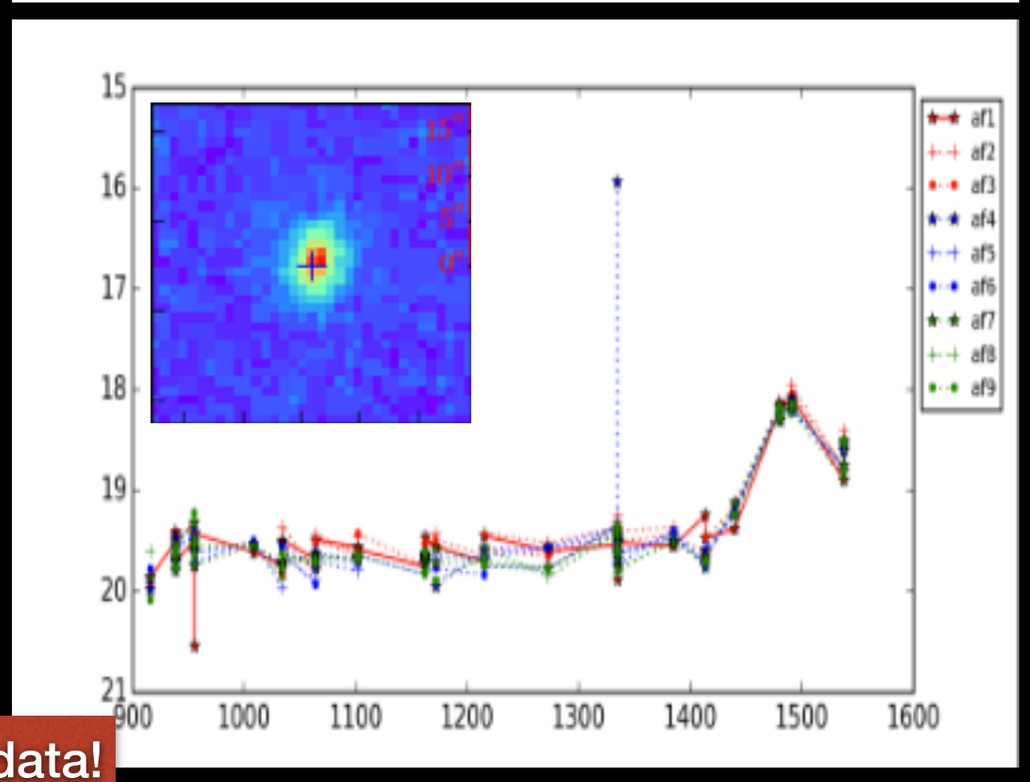
Nuclear transients in Gaia

Gaia's adventage: superb astrometry





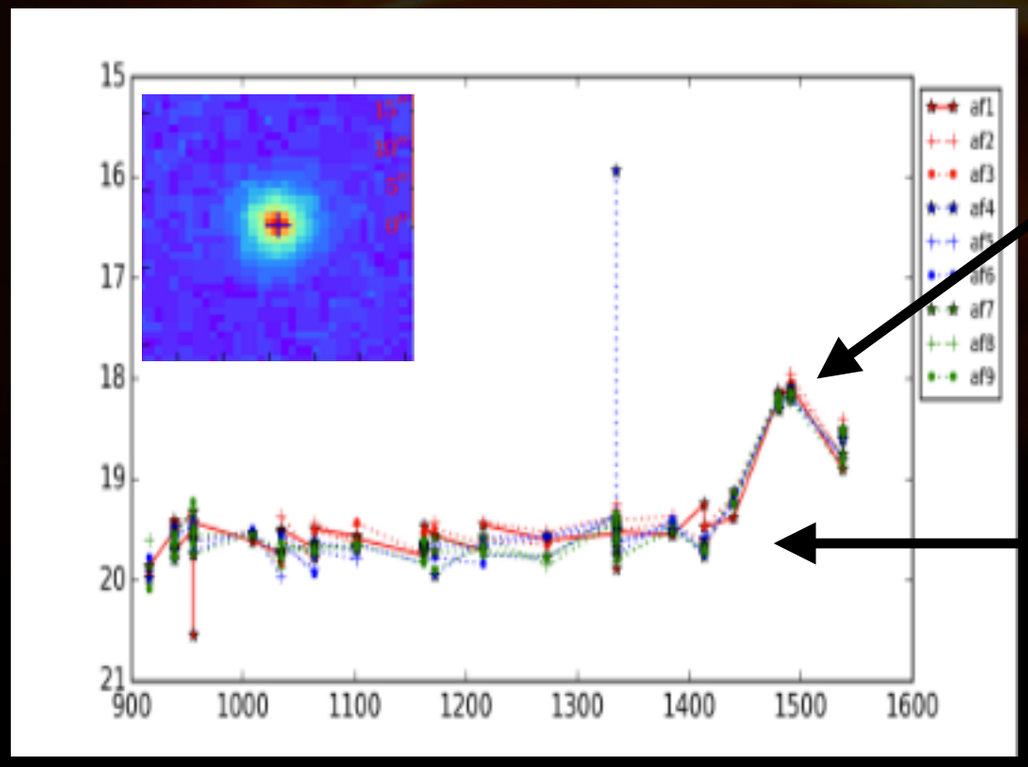


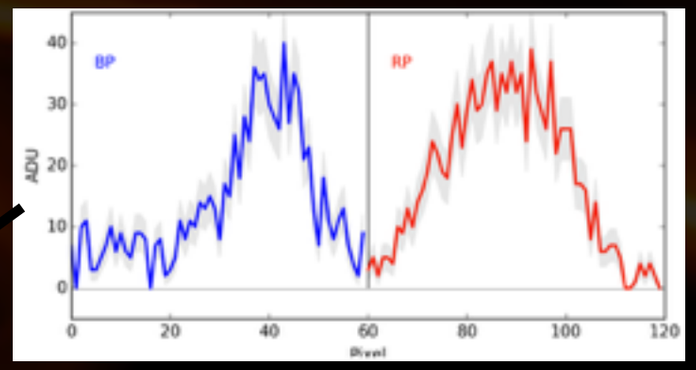


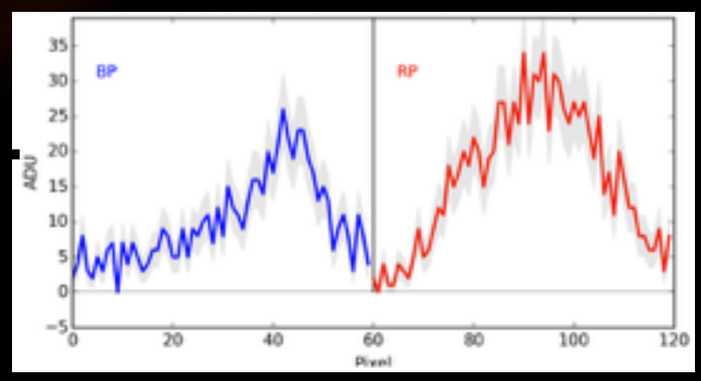
raw public Gaia data!

Nuclear transients in Gaia

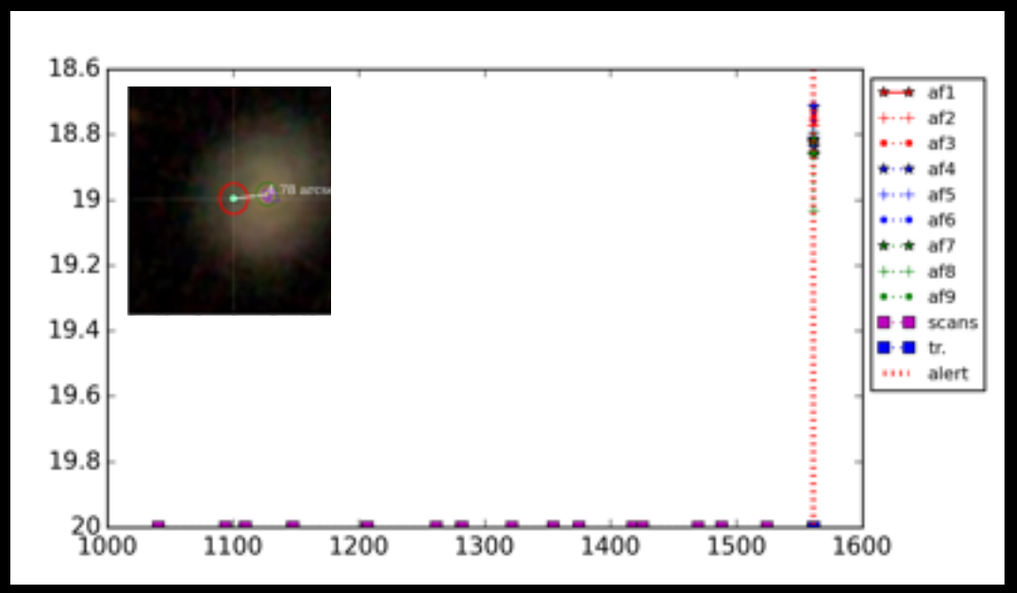
Gaia's adventage: instantaneous low-res spectra

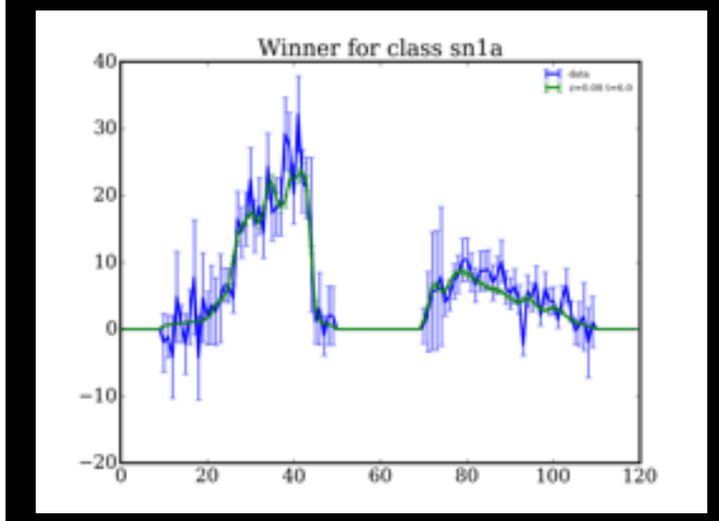






even raw BPRP spectra indicate the detected flare is blue





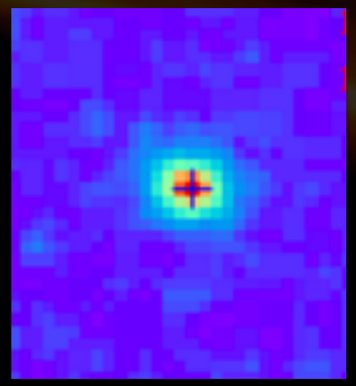
single BPRP spectra at <19mag can recognise SN Ia from other types

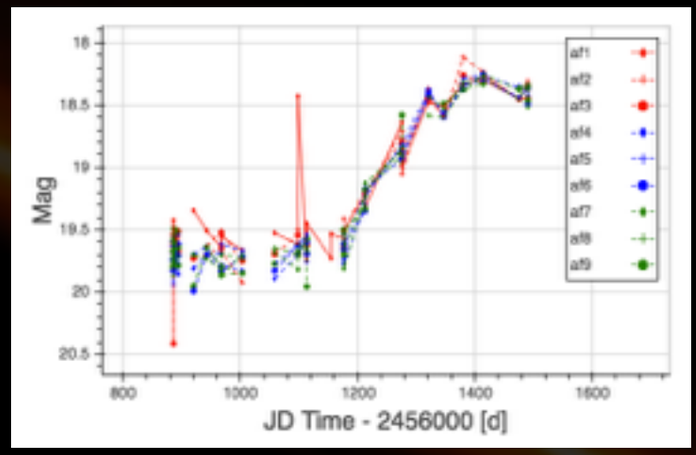
Blagorodnova+2015,2016

raw public Gaia data!

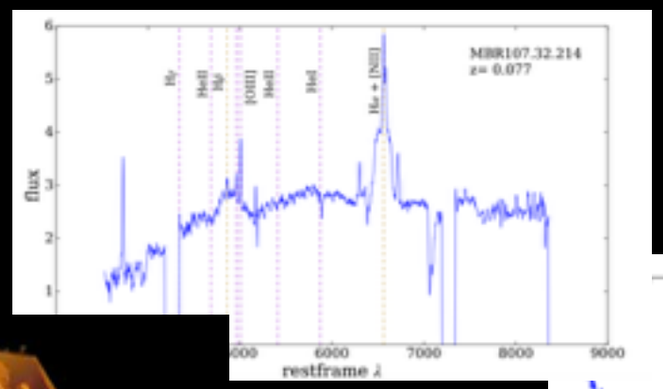
Looking for nuclear transients

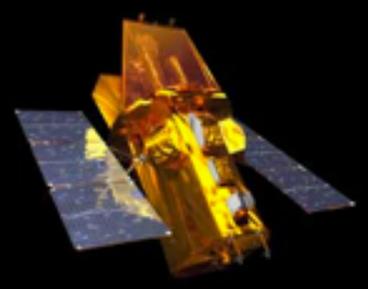
- **Photometric detection**: rapid detection based on the position of the transient (nuclear) and photometric lightcurve

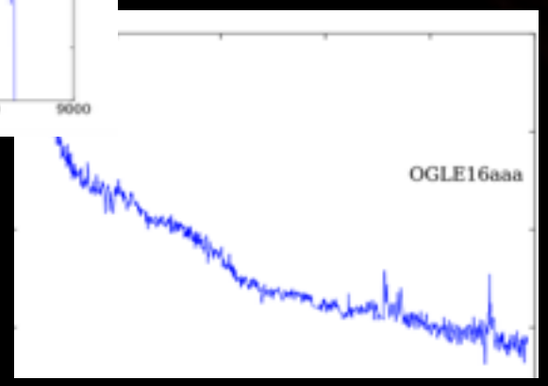




- **Spectroscopic classification:** checking the presence of broad HeII, Ha lines and blue continuum
  SALT, VLT - South
  NOT - North

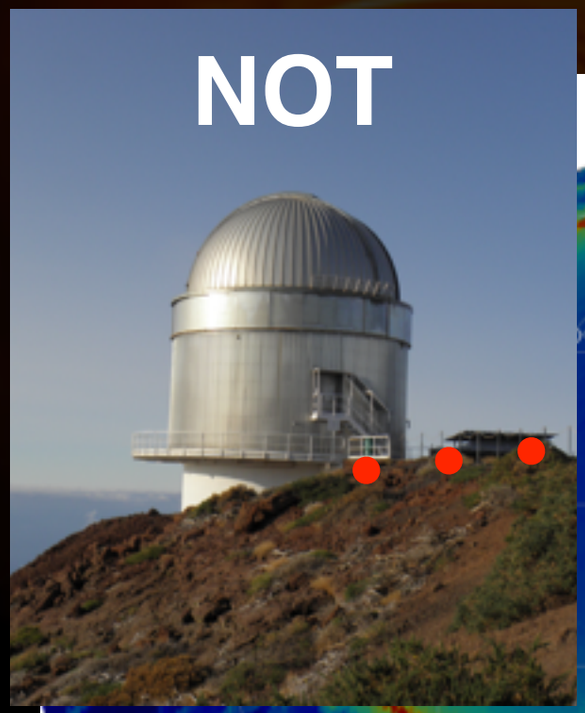


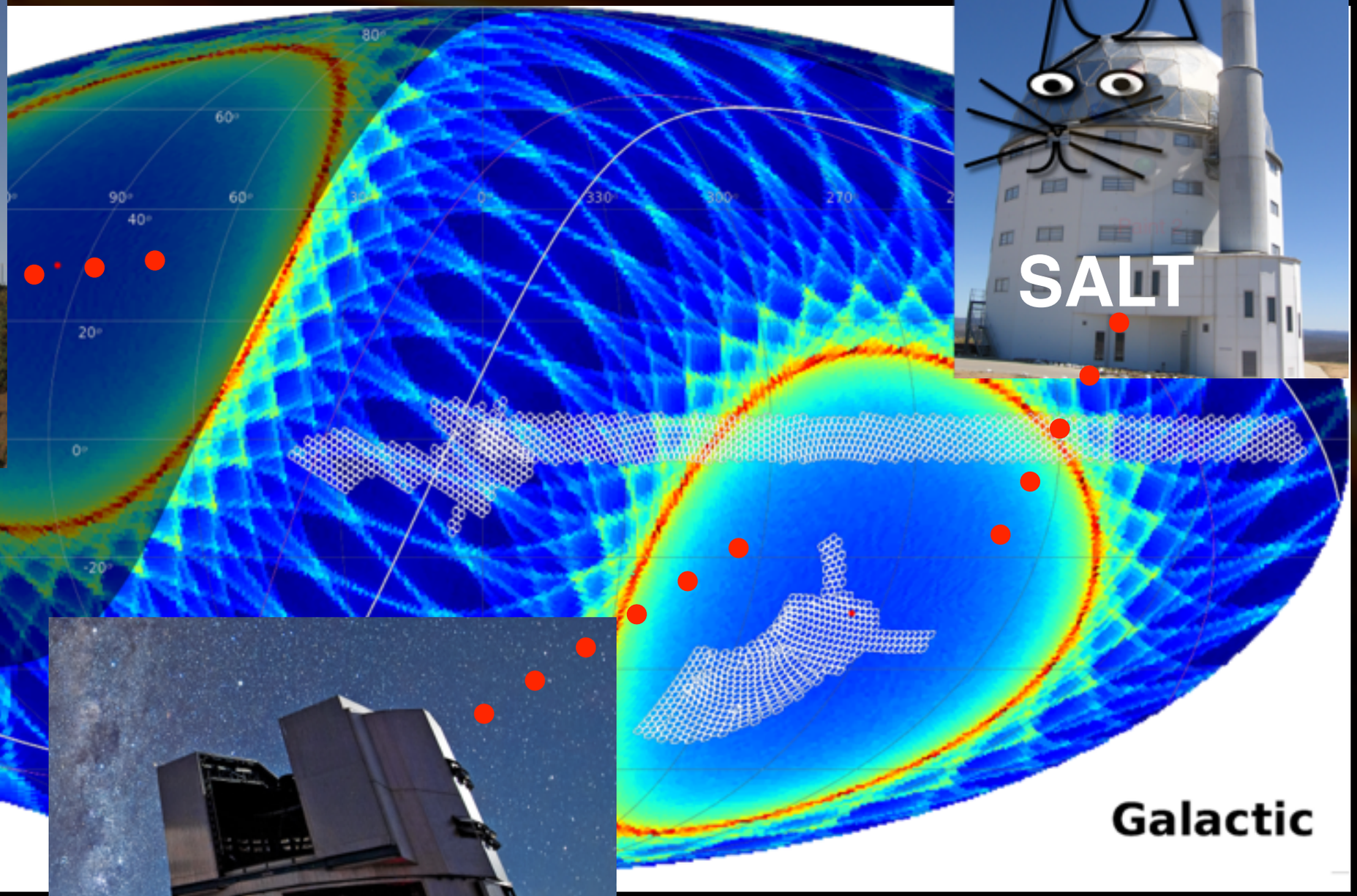




- **UV:** Swift temperature confirmation

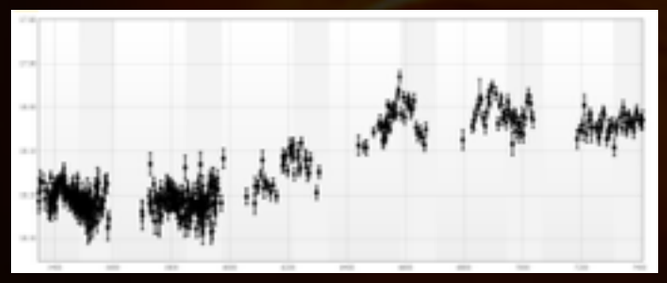
Spectroscopic follow-up





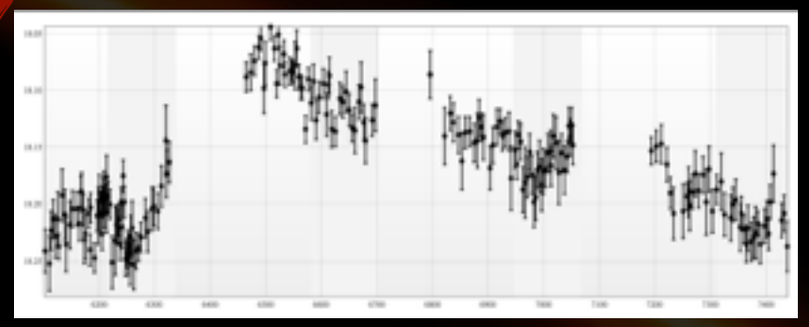
Nuclear transients

AGN activity

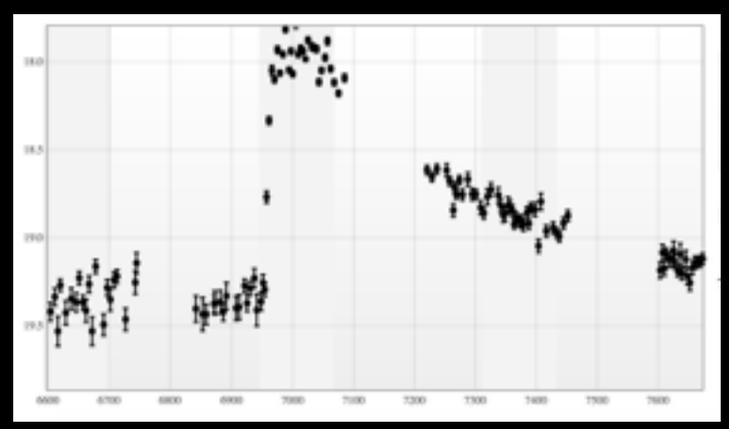


Changing - look AGNs (QSO)

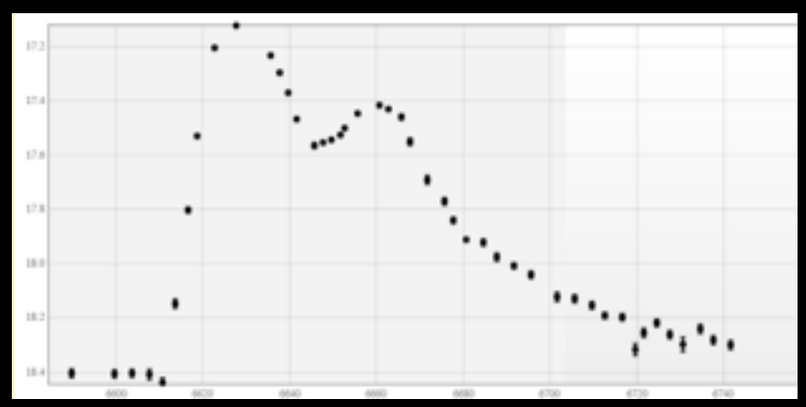
Tidal Disruption events



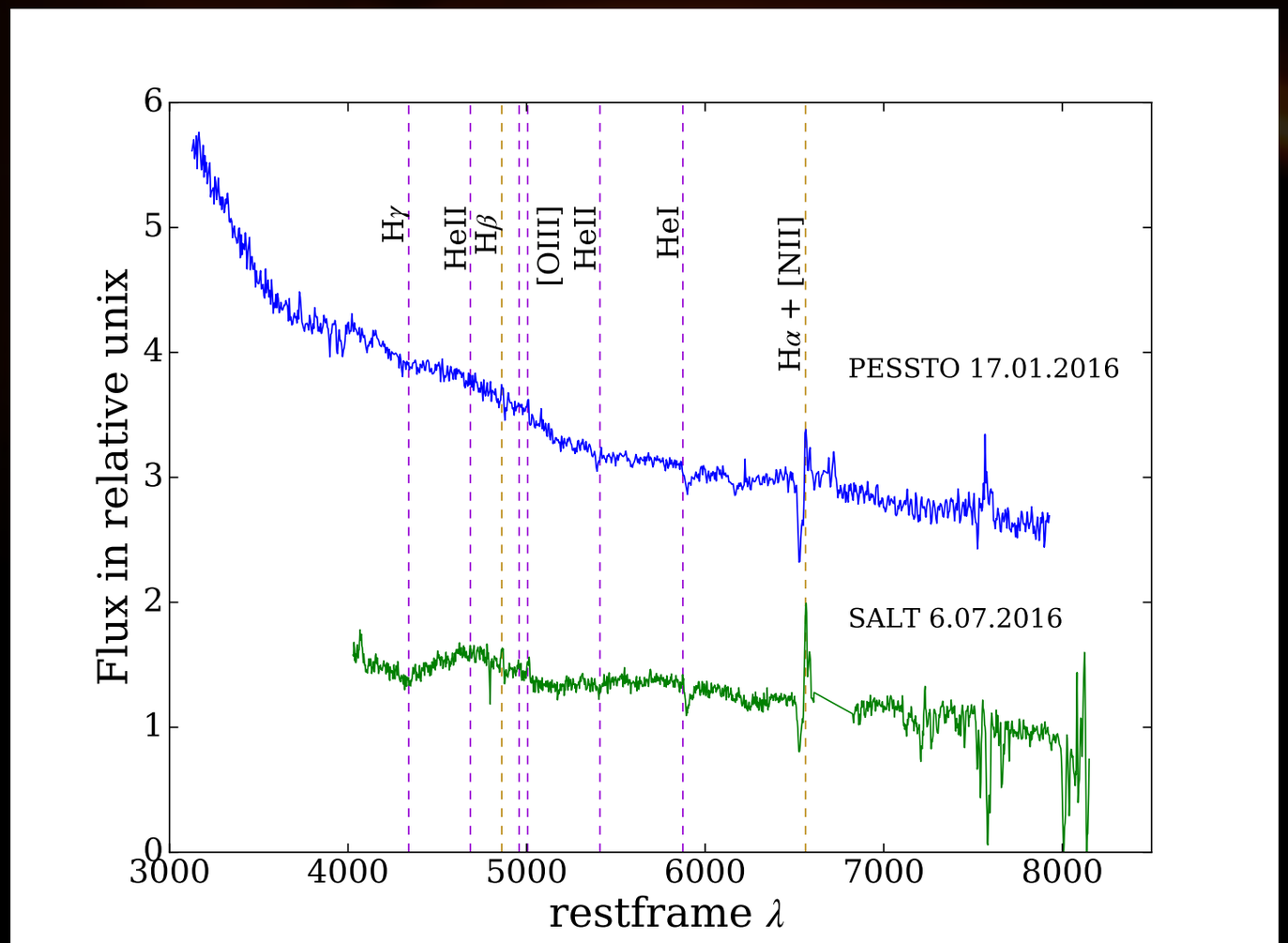
Peculiar Supernovae SN IIP, SN IIn



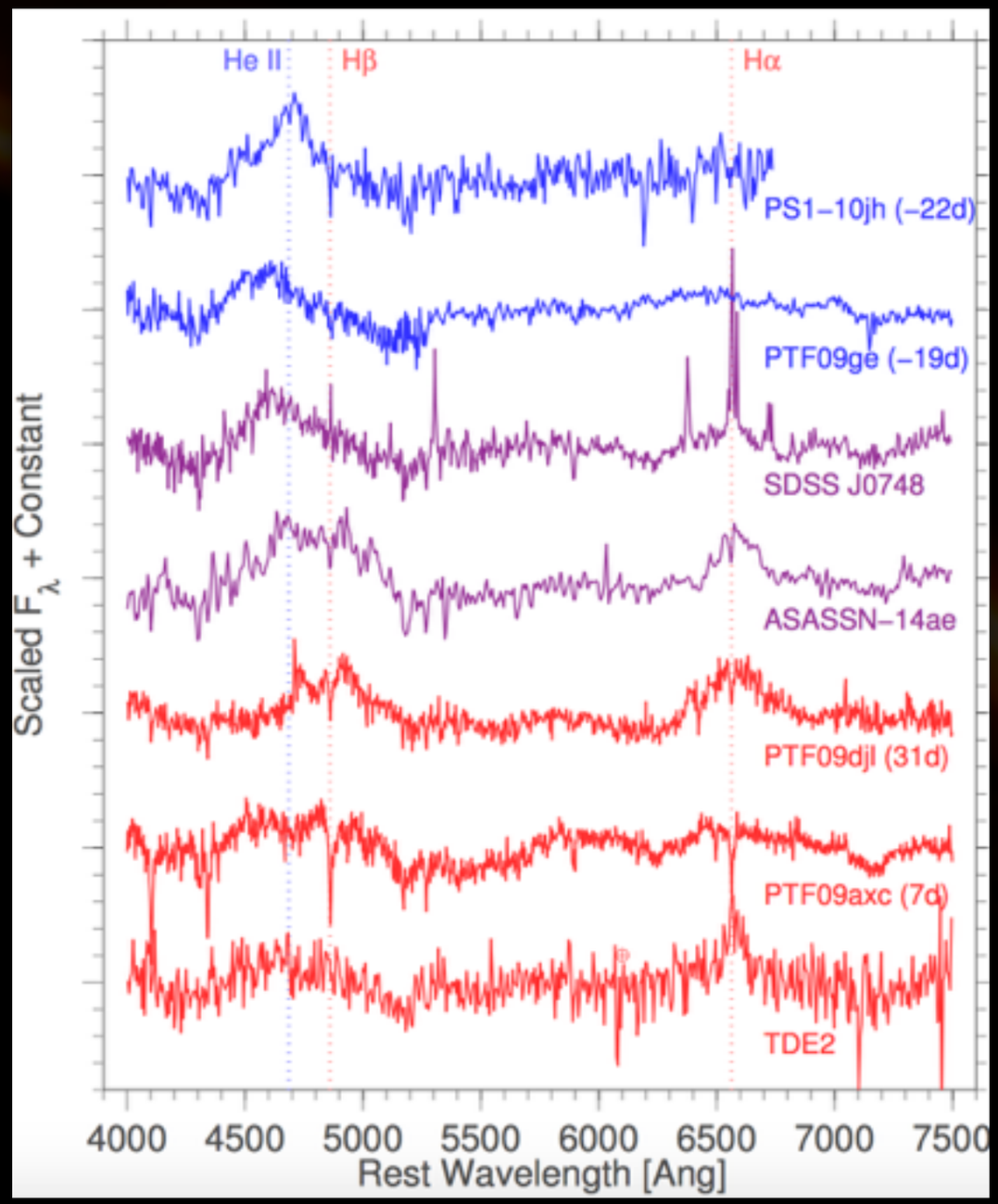
Ia Supernovae



OGLE 16aaa - first TDE in OGLE



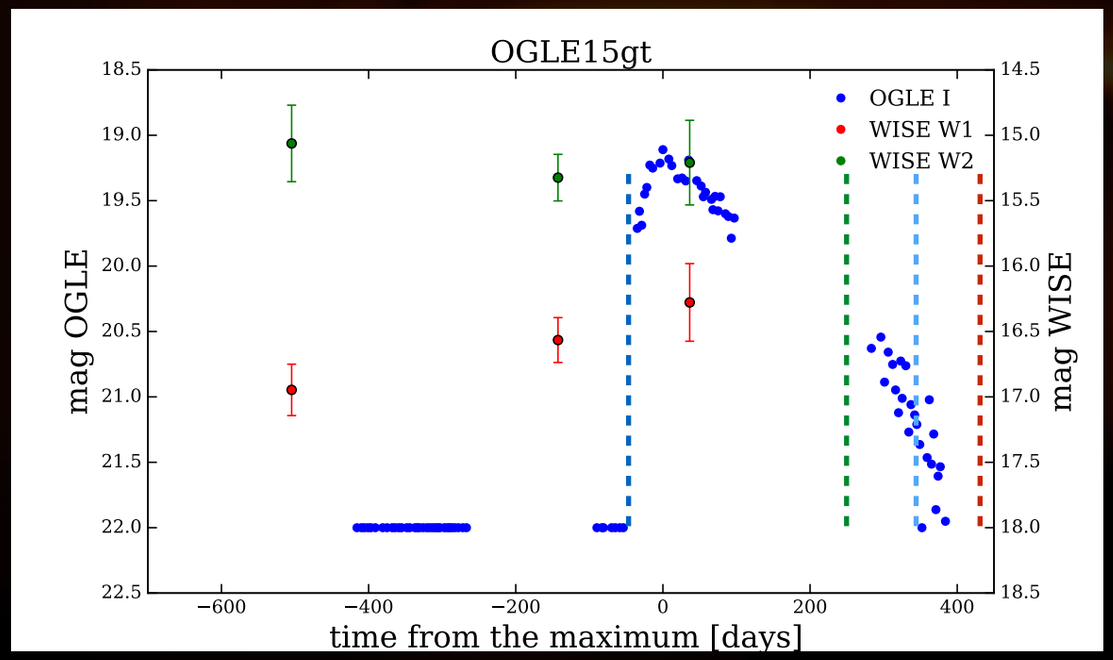
- transient in galaxy centre (z=0.167)
- broad H i He lines
- slow rise to maximum at M=-20.5 mag
- Wyrzykowski et al. (acctepted in MNRAS Letters)

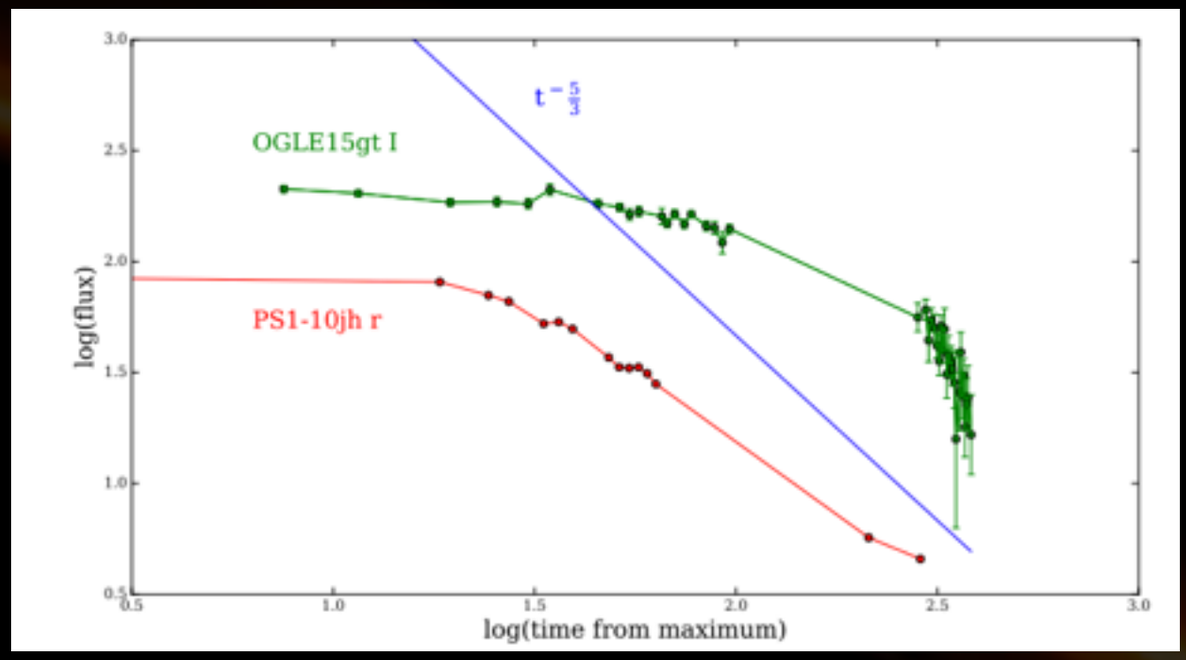


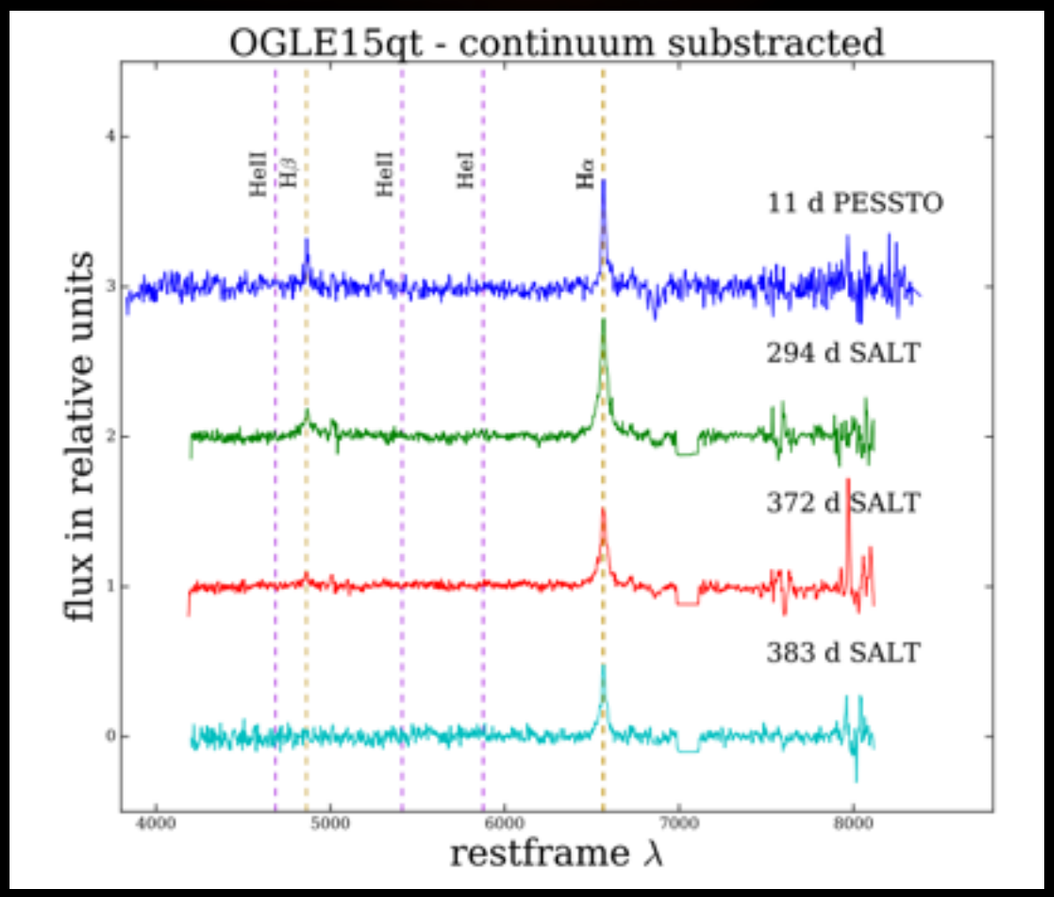
Arcavi et al. 2014

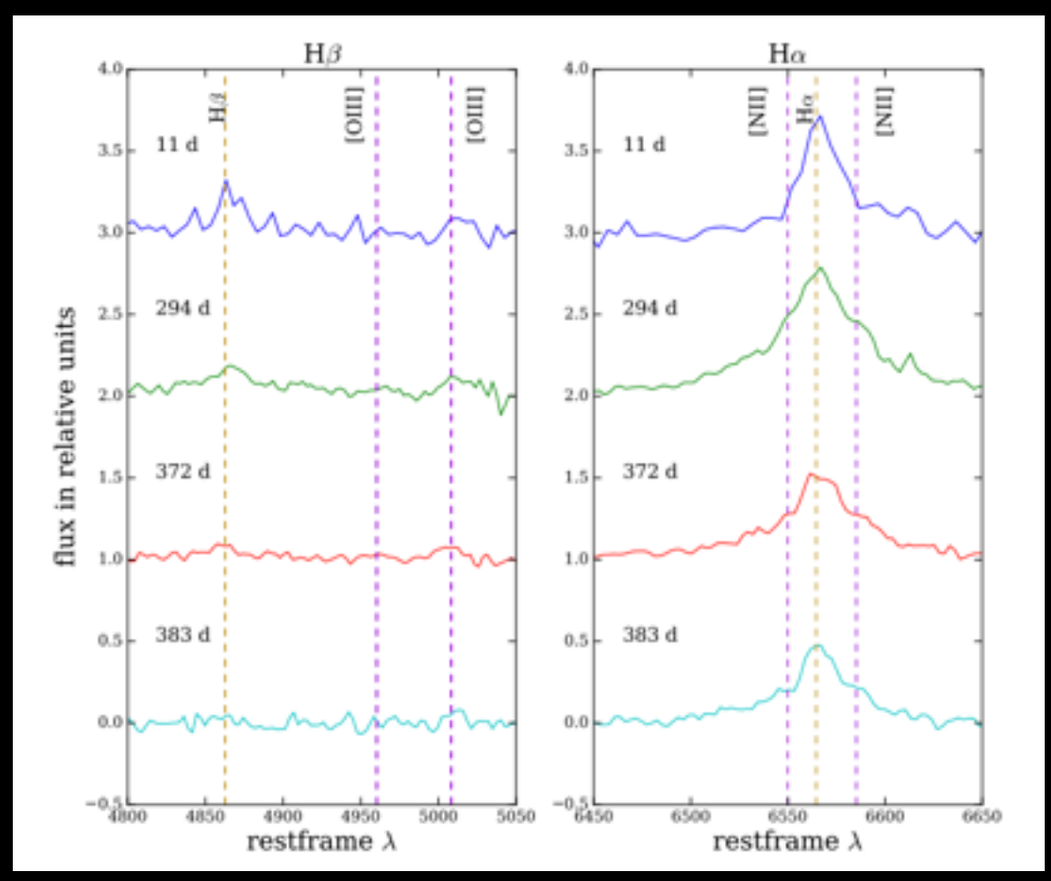
OGLE15gt (SMC764.02.260, OGLE15ib)

23:50:09.23 -69:09:55.7

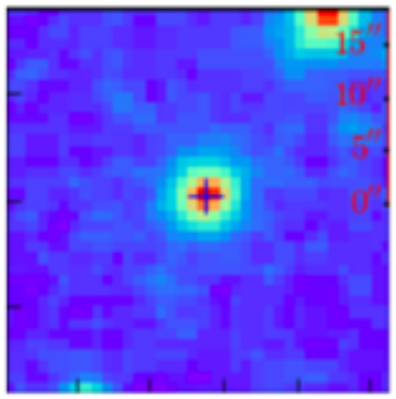


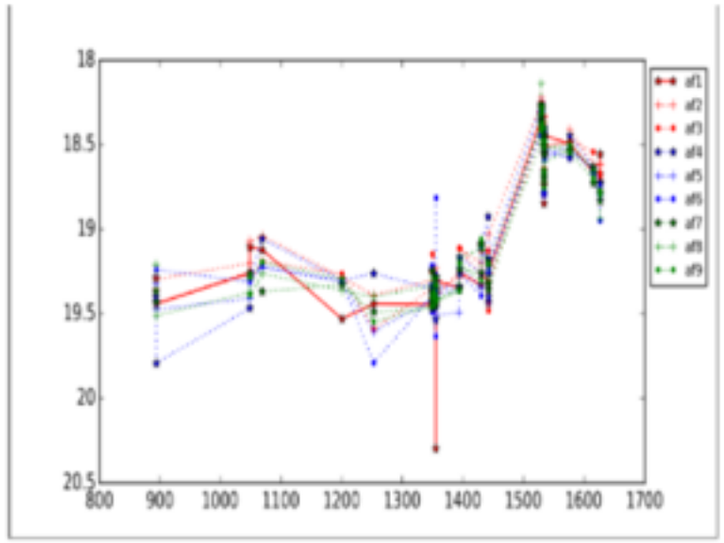






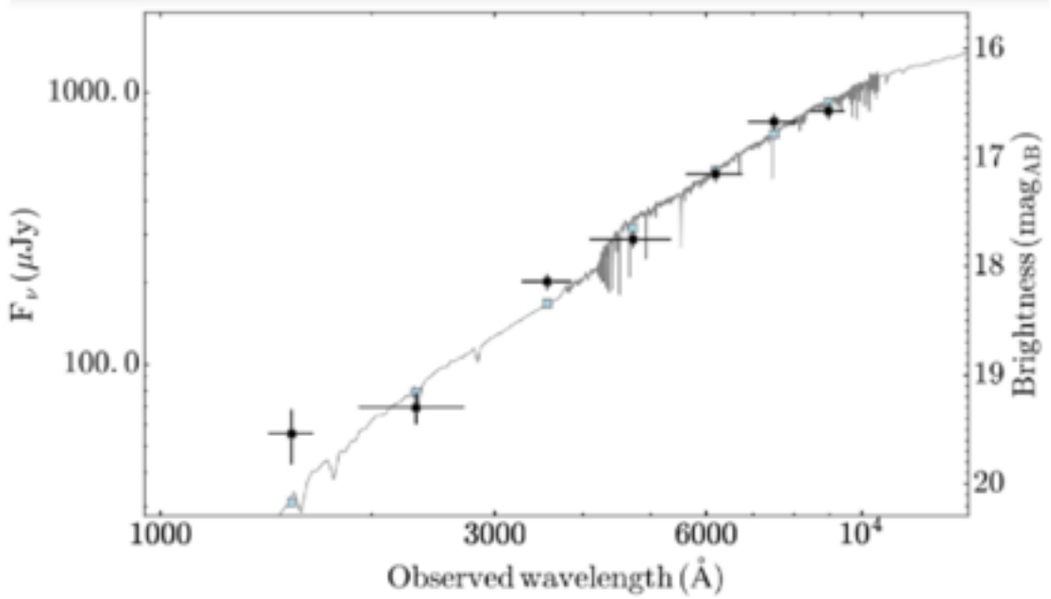
Gaia16apt



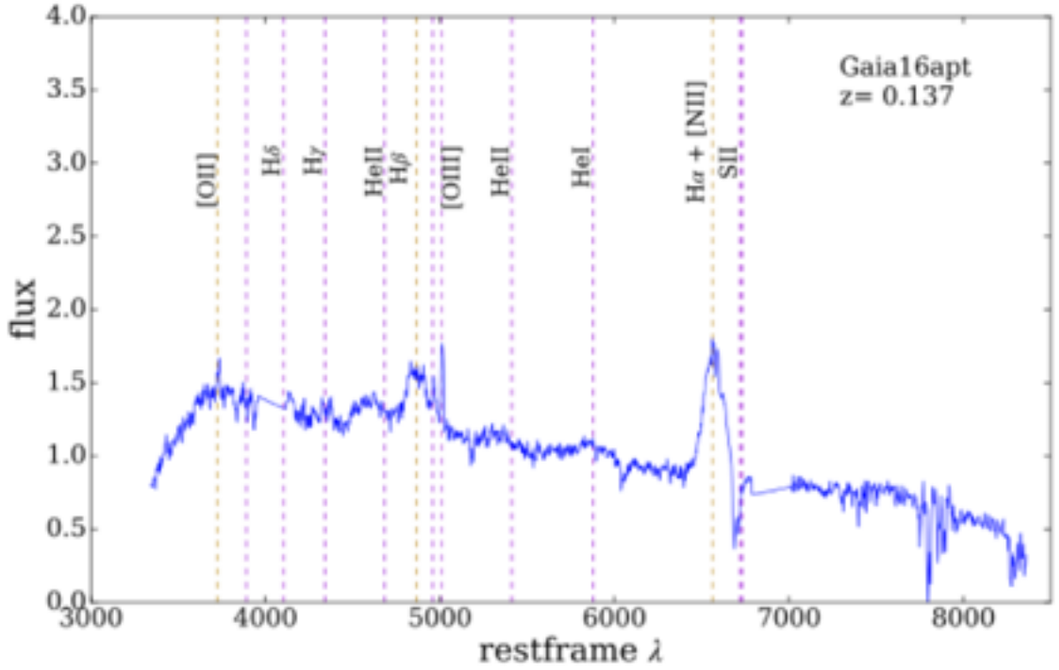


ATel #9497

- 3-07-2016 SALT
- z=**0.13650** -> 648.1 Mpc
- M_I = -20.78 (for Gaia alerting mag)
- **Potential SN IIn/CLQ**

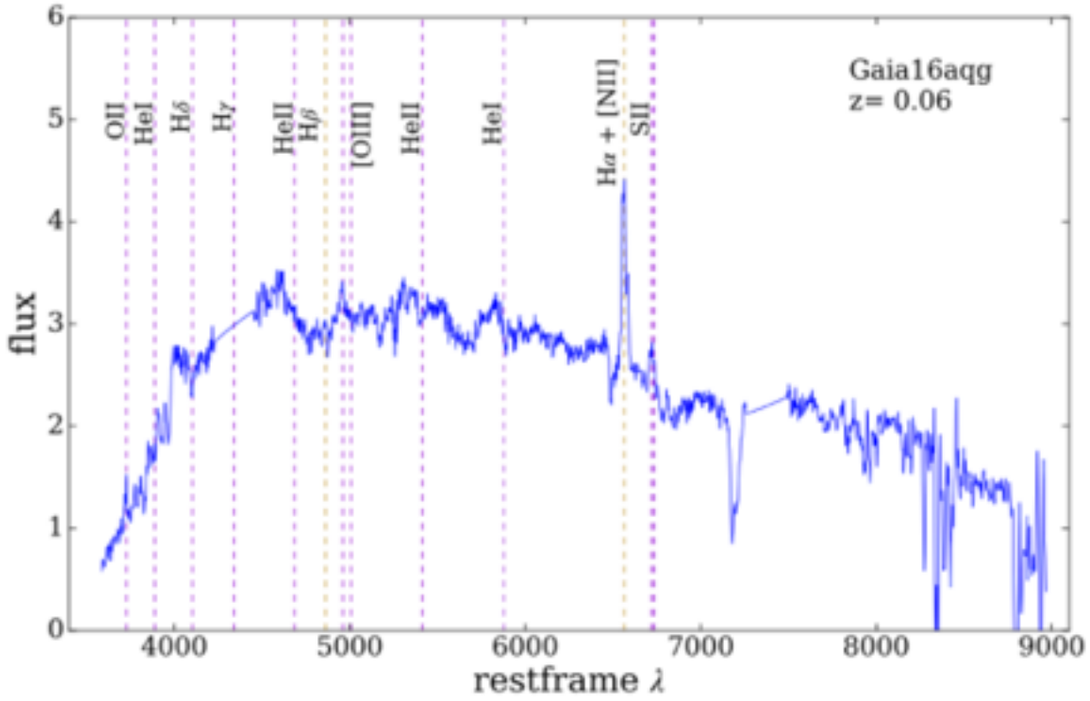


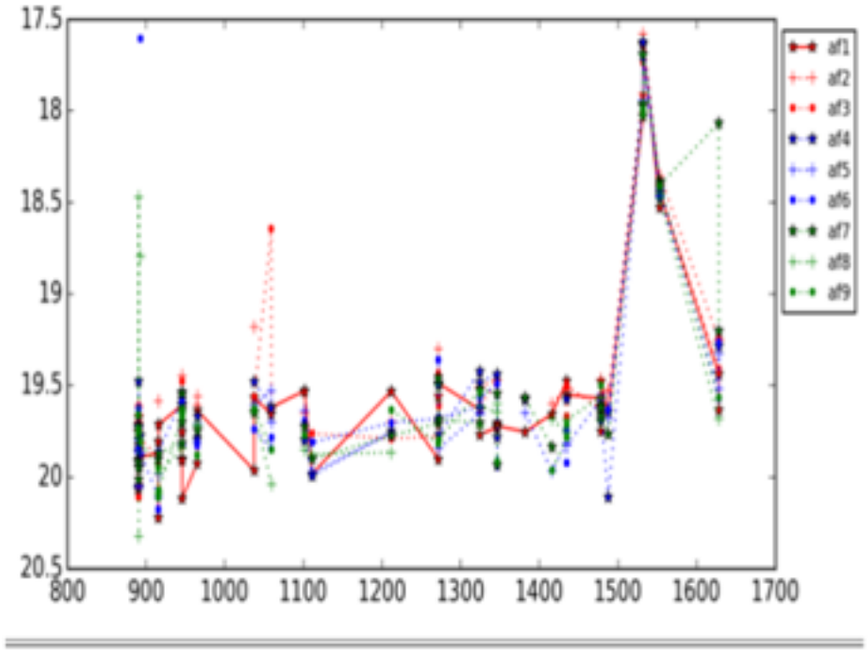
Host model, based on GALEX, SDSS (by Thomas Kuehler) - highly starforming galaxy, mass 10^10 MSun



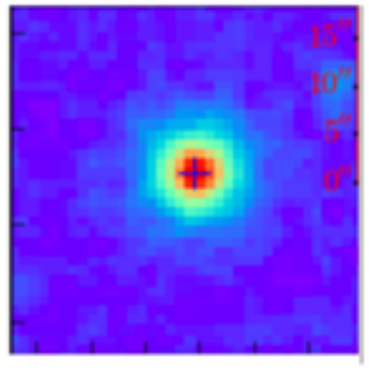
Gaia16aqg

ATel #9497





- SALT 08-07-2016
- z=0.05956
- Candidate SN II - broad P-Cyg profile at Halpha (signature of an expanding H envelope)



Gaia16btt

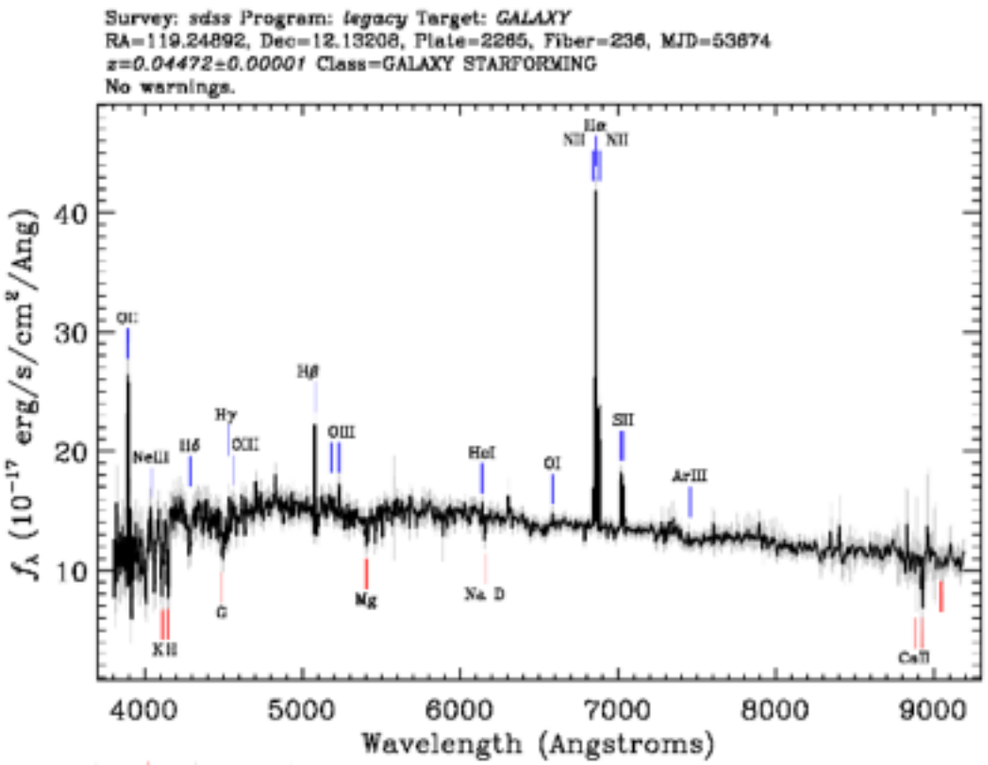
SDSS archival spec: Galaxy-Starforming
z=0.04472

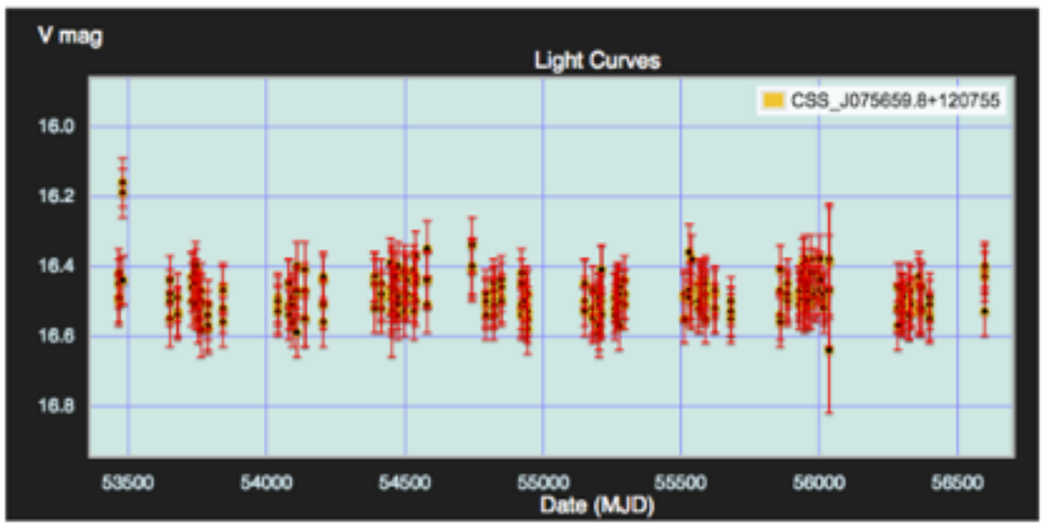
Gaia BPRP spec not much like SN Ia

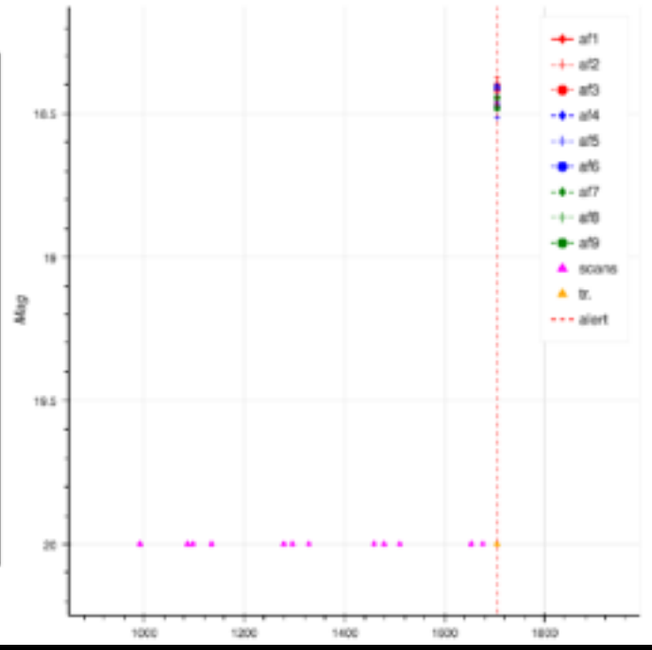
GS-TEC predicts AGN

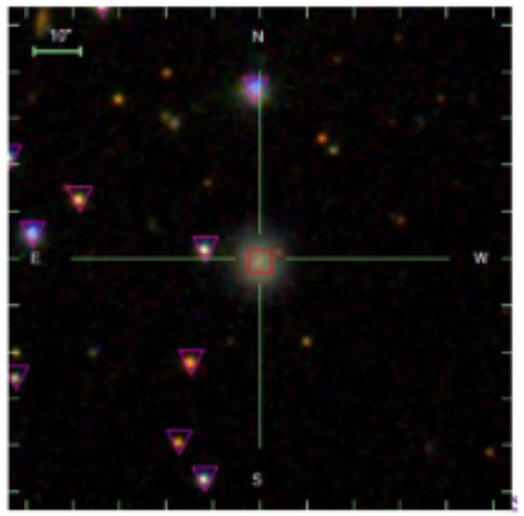
Potential ASTEROID nearby??

CRTS shows no prior flares





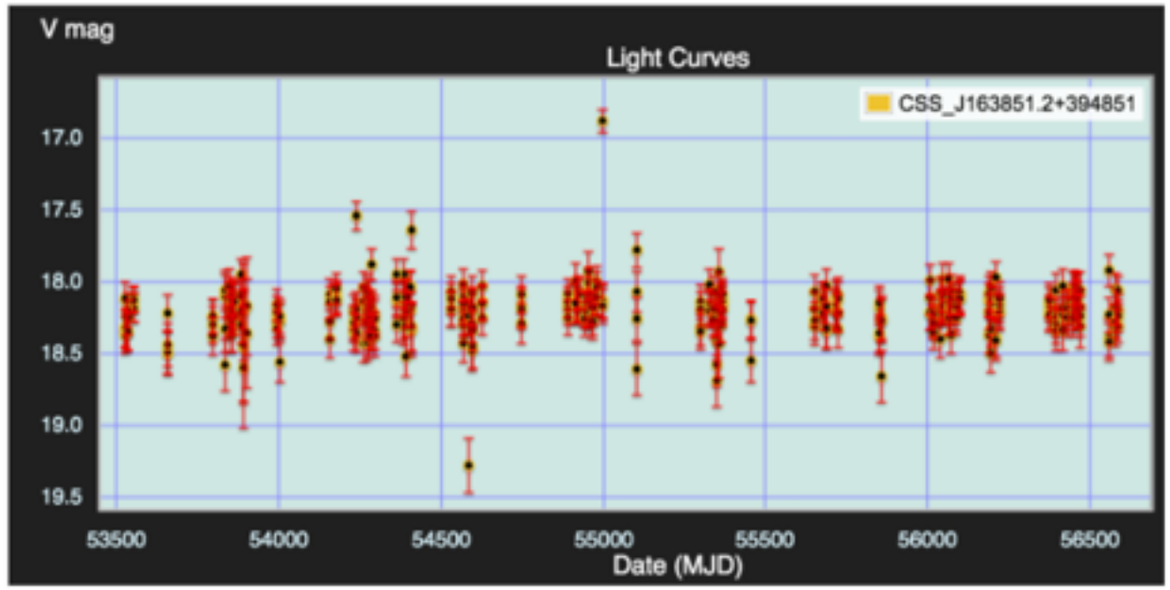


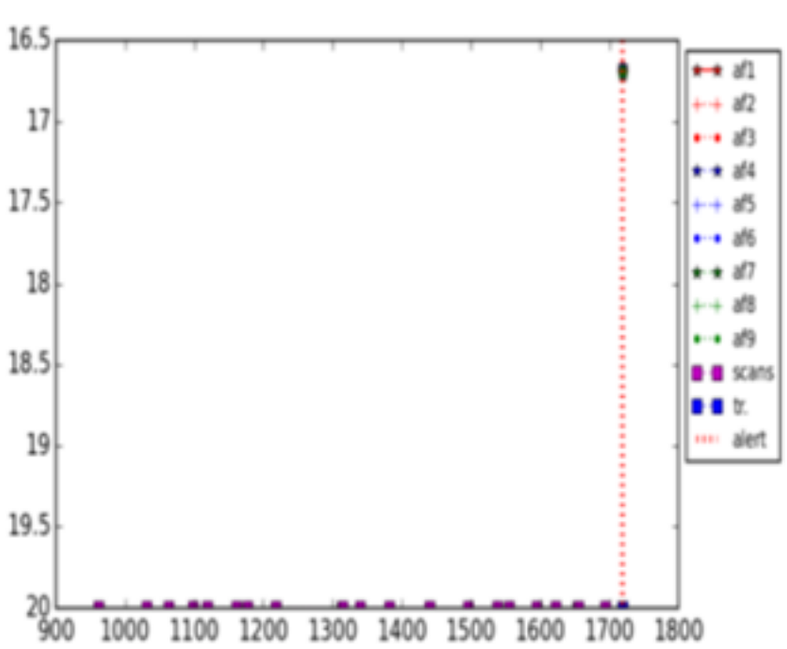


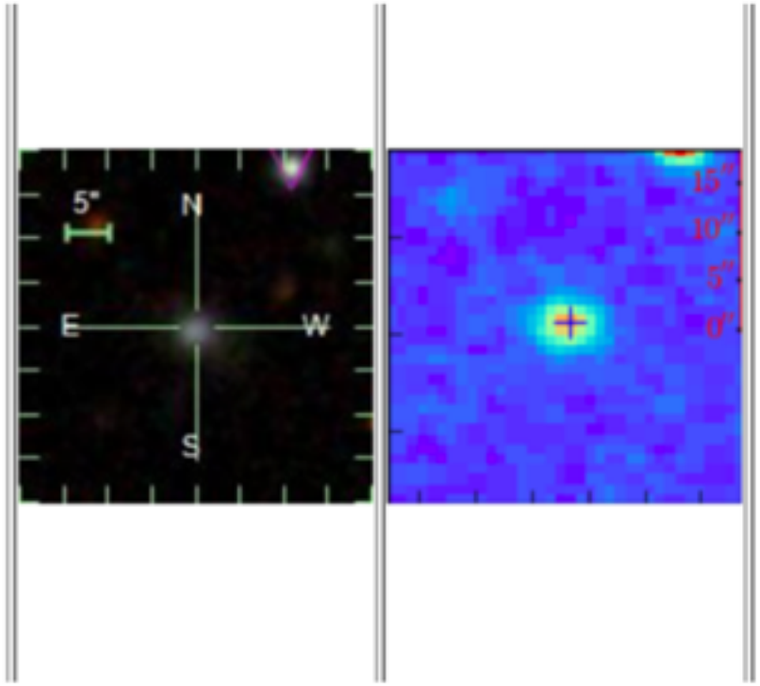
Gaia16byk

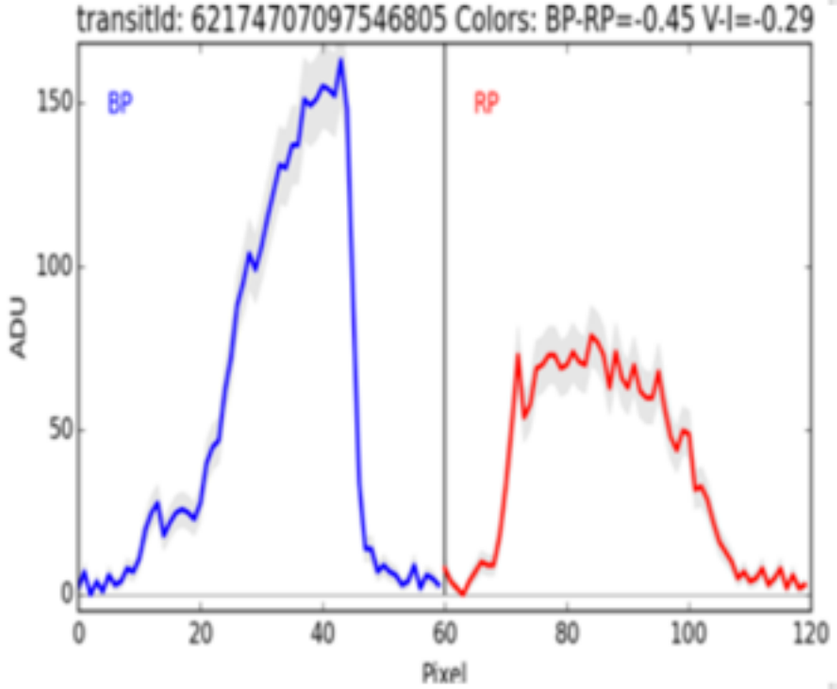
Faint diffuse galaxy, so not sure if nuclear

Very bright - CV?? Or SLSN?







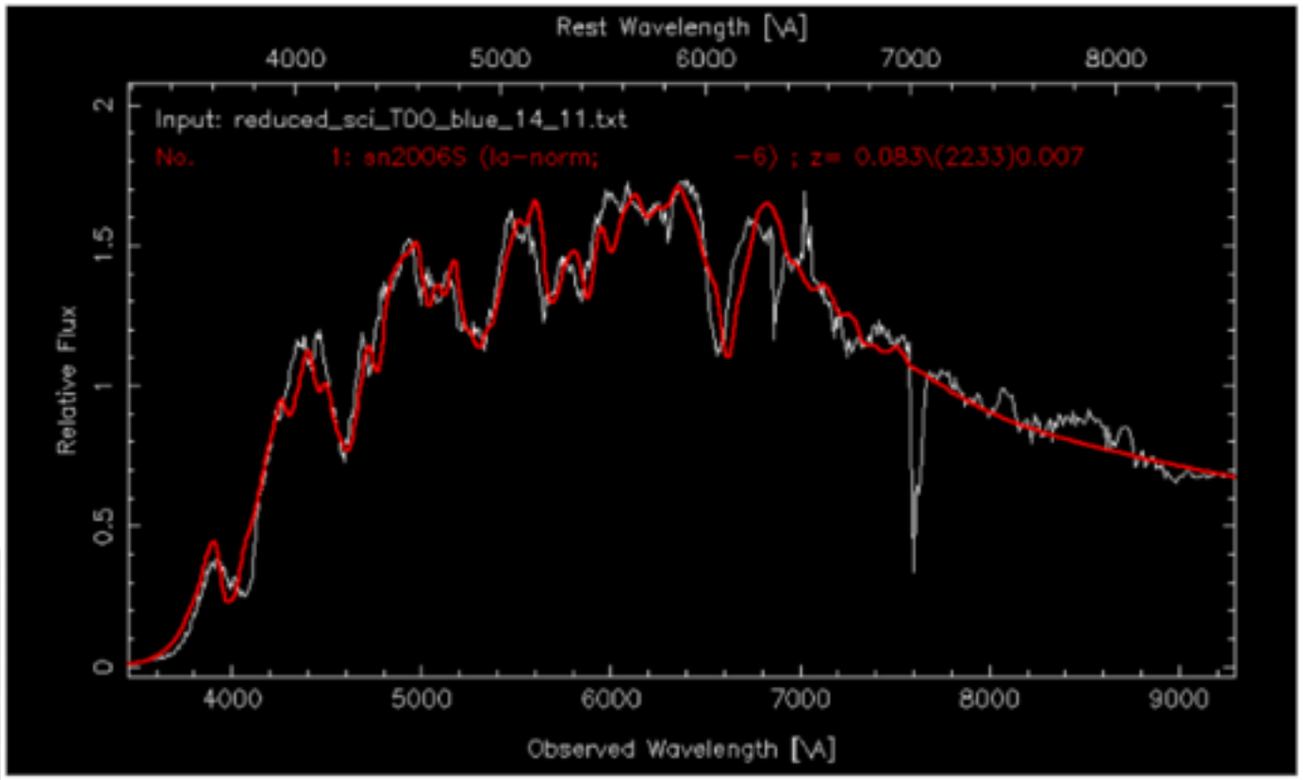


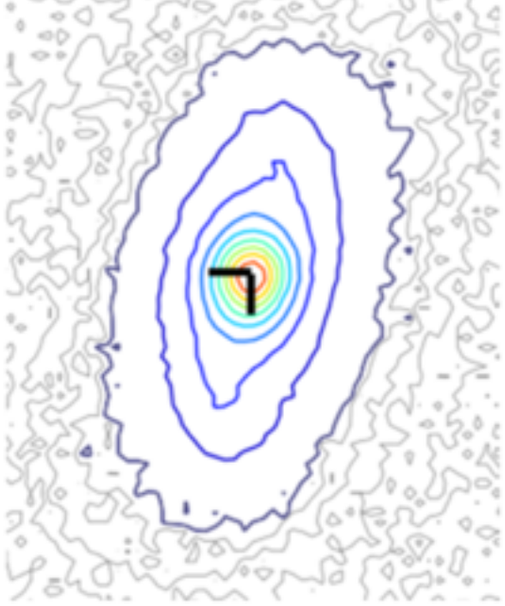
OGLE16fix ATel #9763

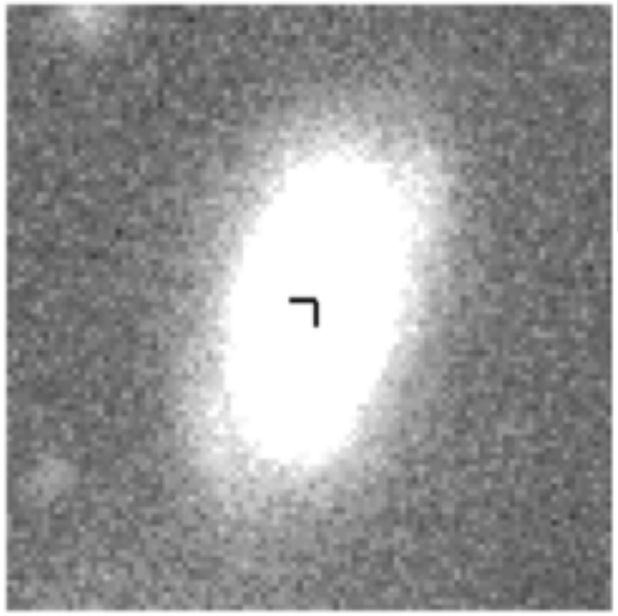
SN Ia at -6d before max

VLT/FORS2

OGLE I-band deep, 26x26"







Future

- **Gaia:** SDSS galaxies monitoring - looking for nuclear transients in the galaxies with known spectra.
  NORTH -> NOT
  SOUTH - > SALT, VLT

- **AGN monitoring** - possible changing look, we don’t exclude the possibility of TDE in AGN

I am looking for

PhD from Sep.2017 !