

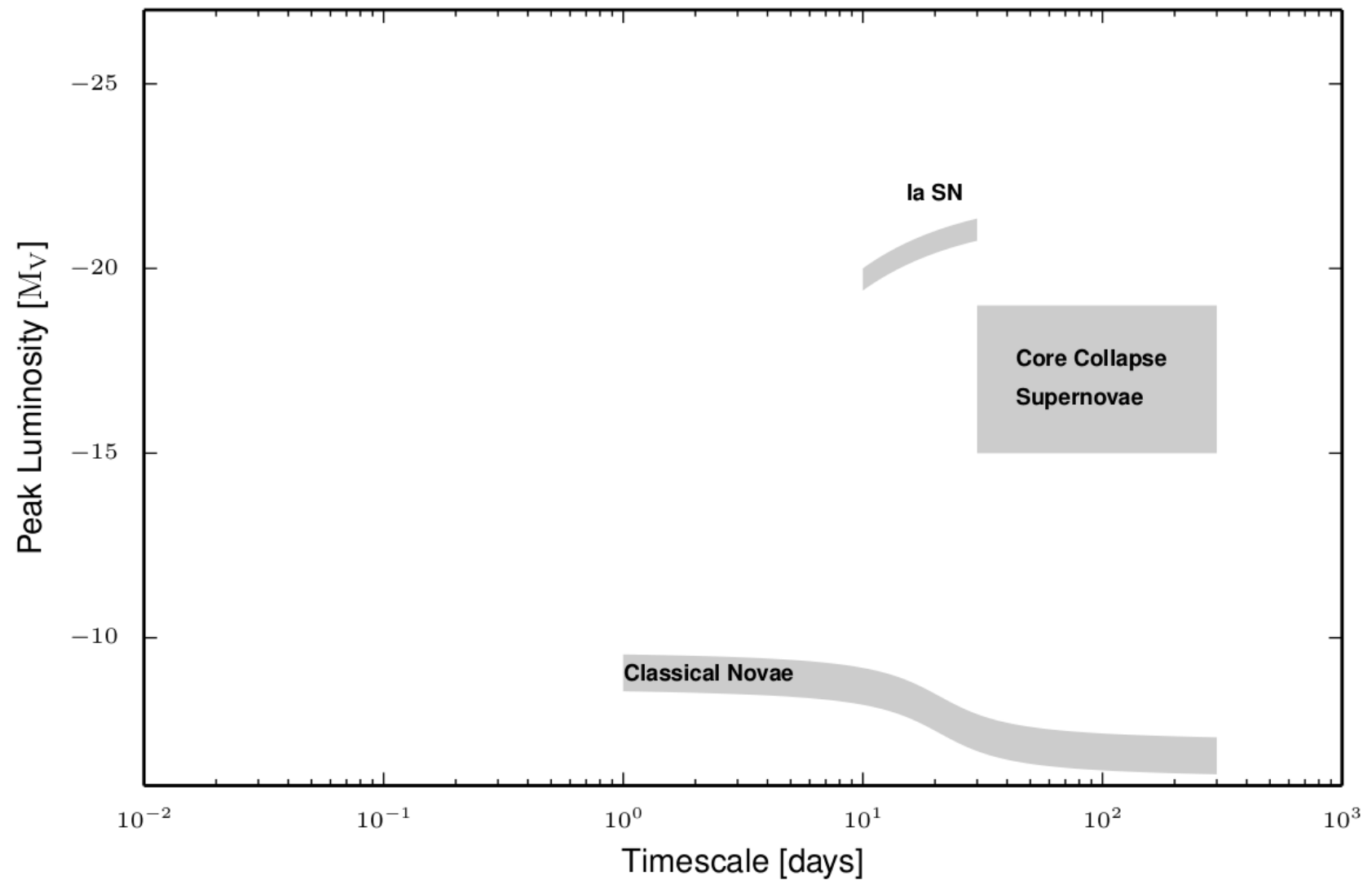
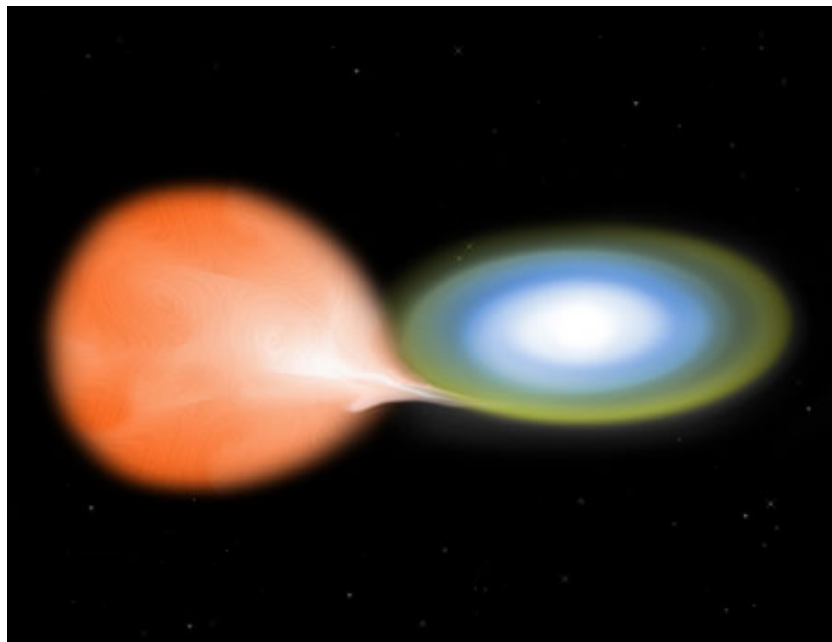
Sky2Night: Intranight Optical Transients

Jan van Roestel
P. Groot, S. Kulkarni

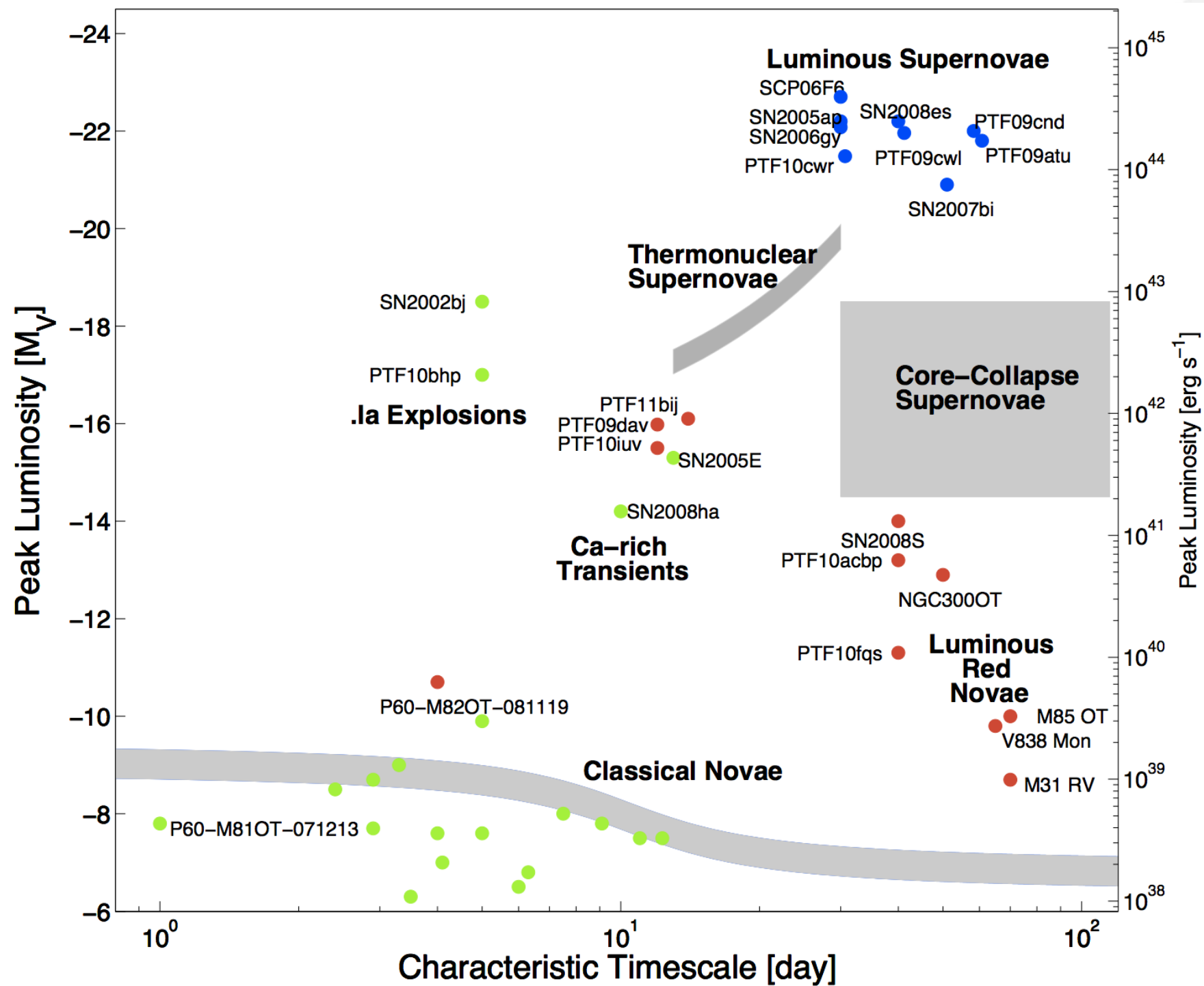
Optical Transients

- Classical Transients:
- Supernovae
 - Novae

- Outbursting stars:
- Flare stars
 - Dwarf Novae



Optical Transients



Taken from Kasliwal 2011

Fast Optical Transients

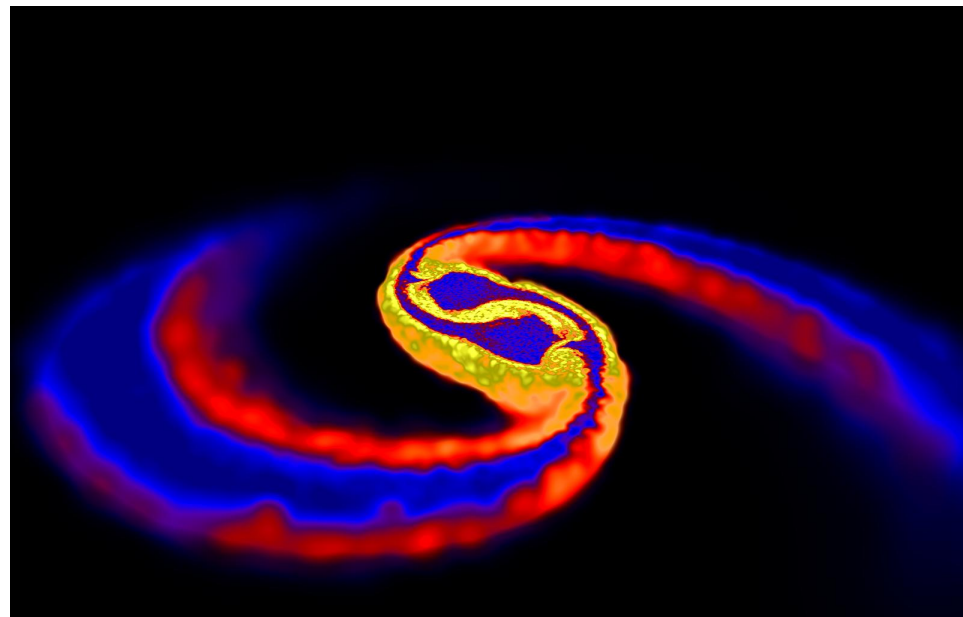
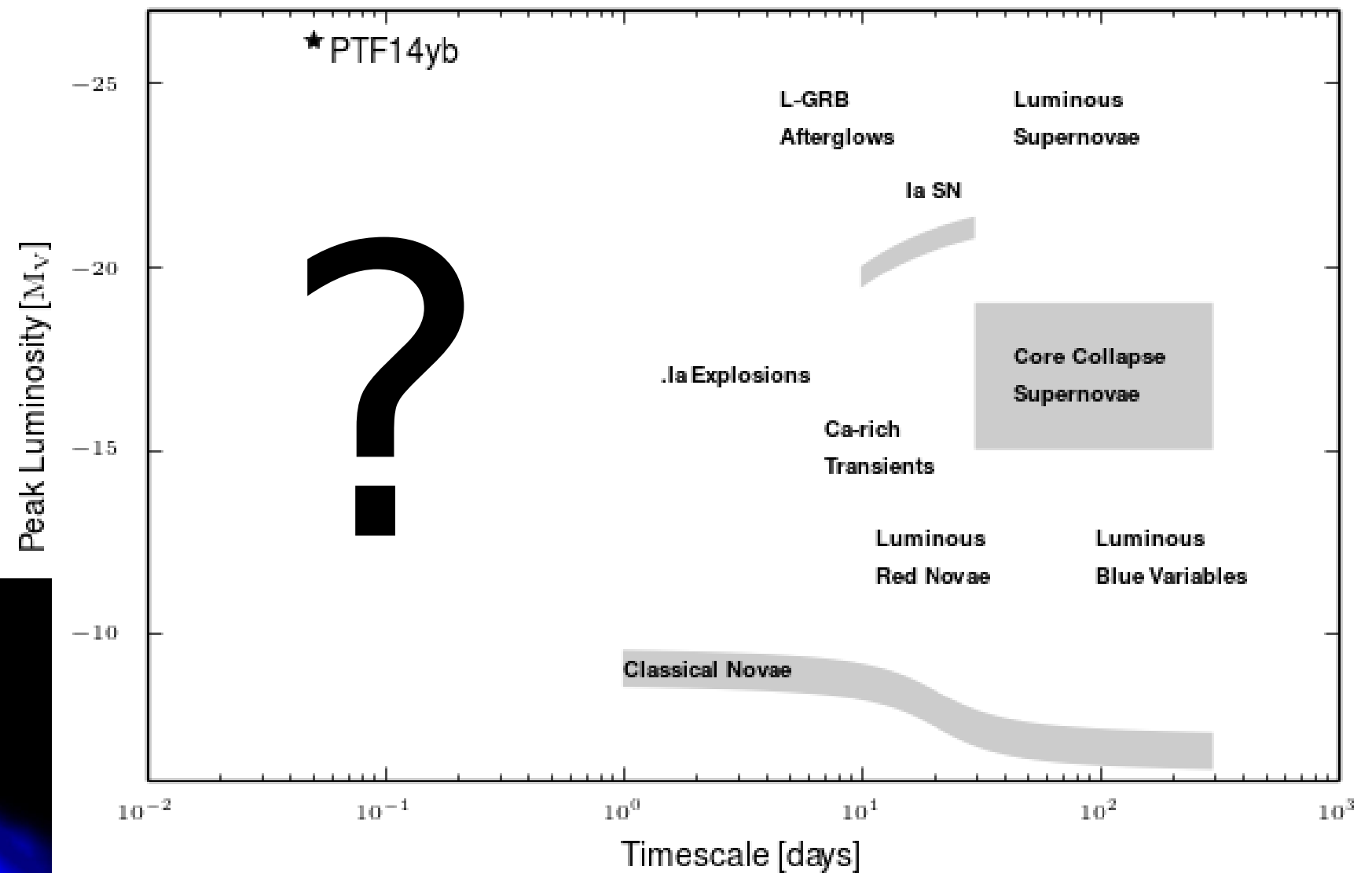


Image from Price and Rosswog

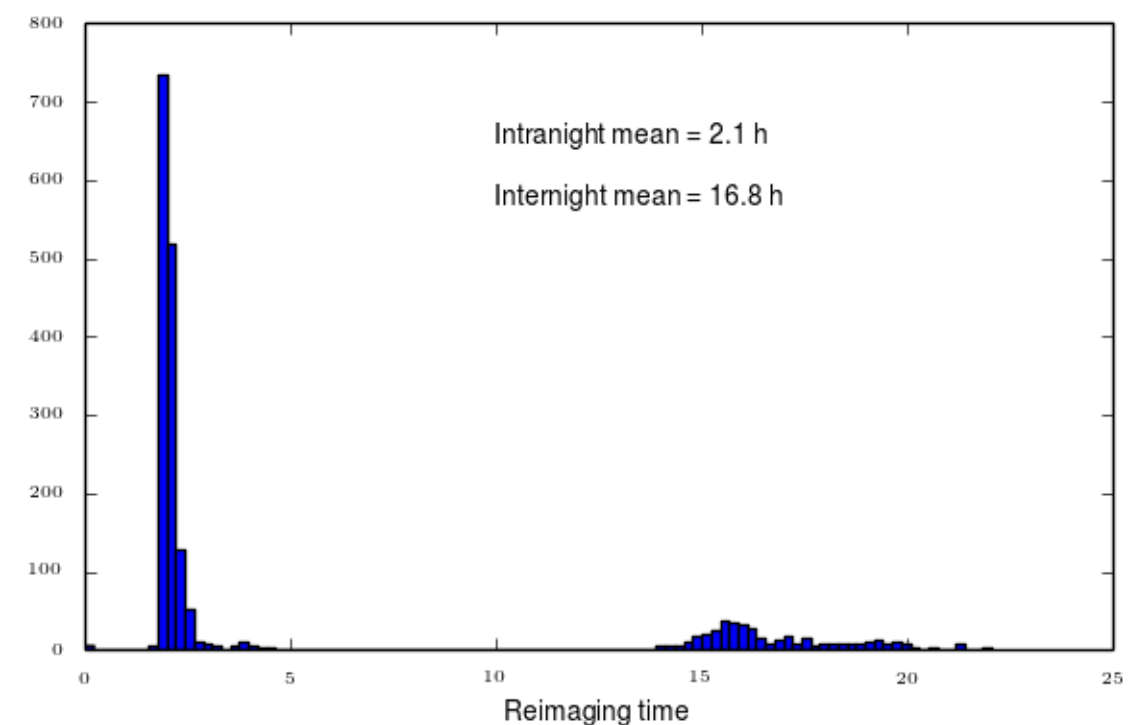
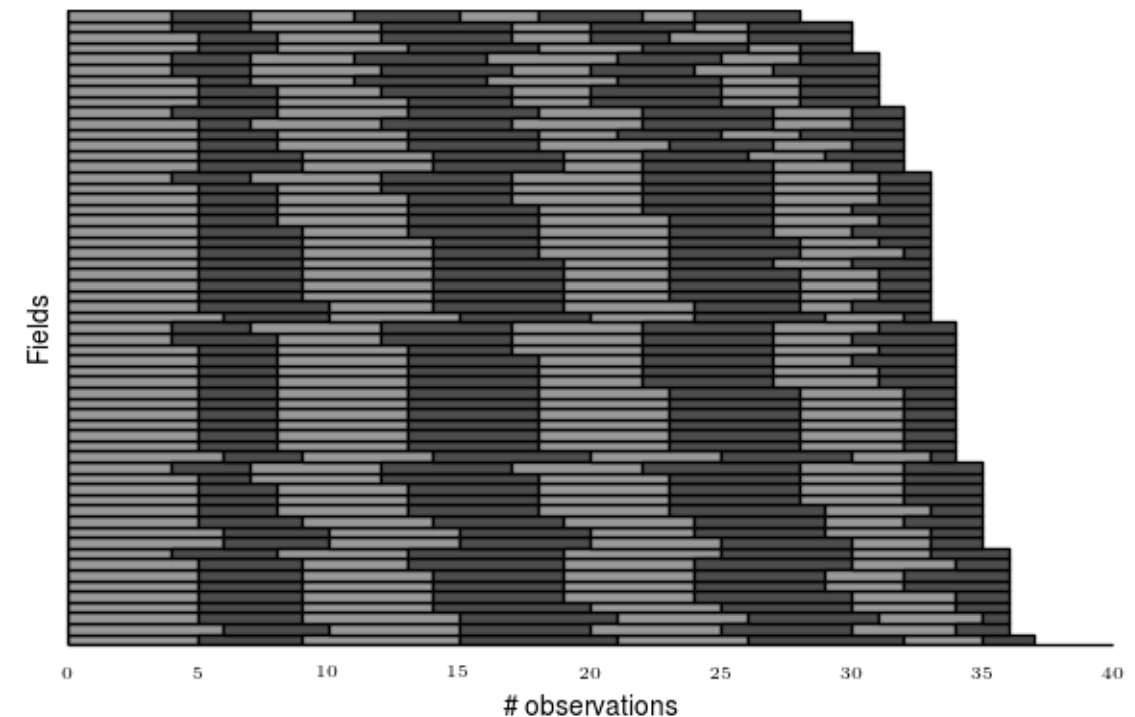
Sky2Night: Setup

PTF Photometry

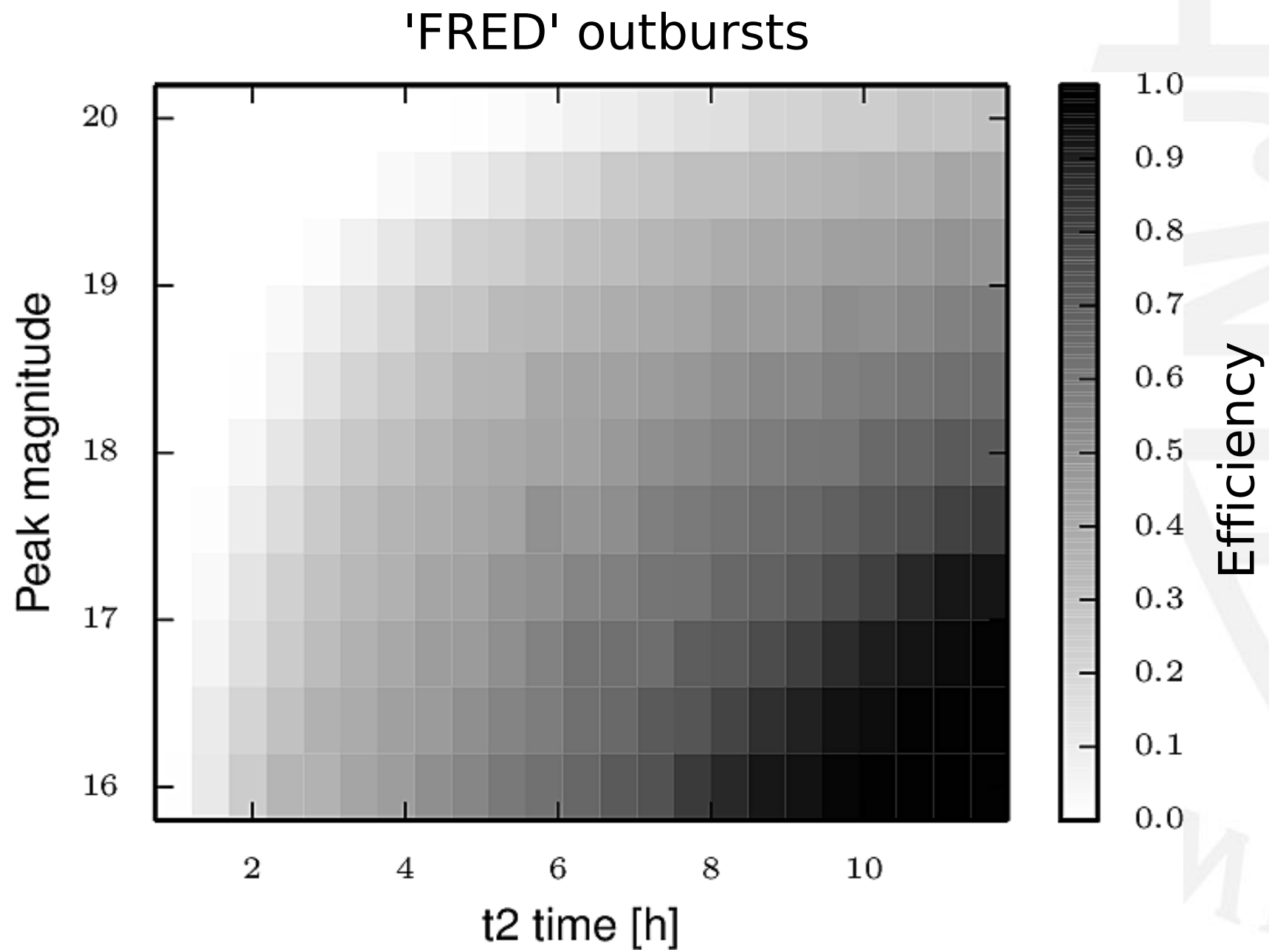
- 59 PTF fields, 428 deg²
- Cadence 2 hours, 8 nights
- Exposure time: 60 seconds
- Magnitude range: ~13 - ~21

WHT ACAM Spectroscopy

- 5 nights
- 4.2m
- Medium resolution, ~3 Angstrom/pixel
- 50 Objects observed



Sensitivity of Sky2Night



Sky2Night: Observations

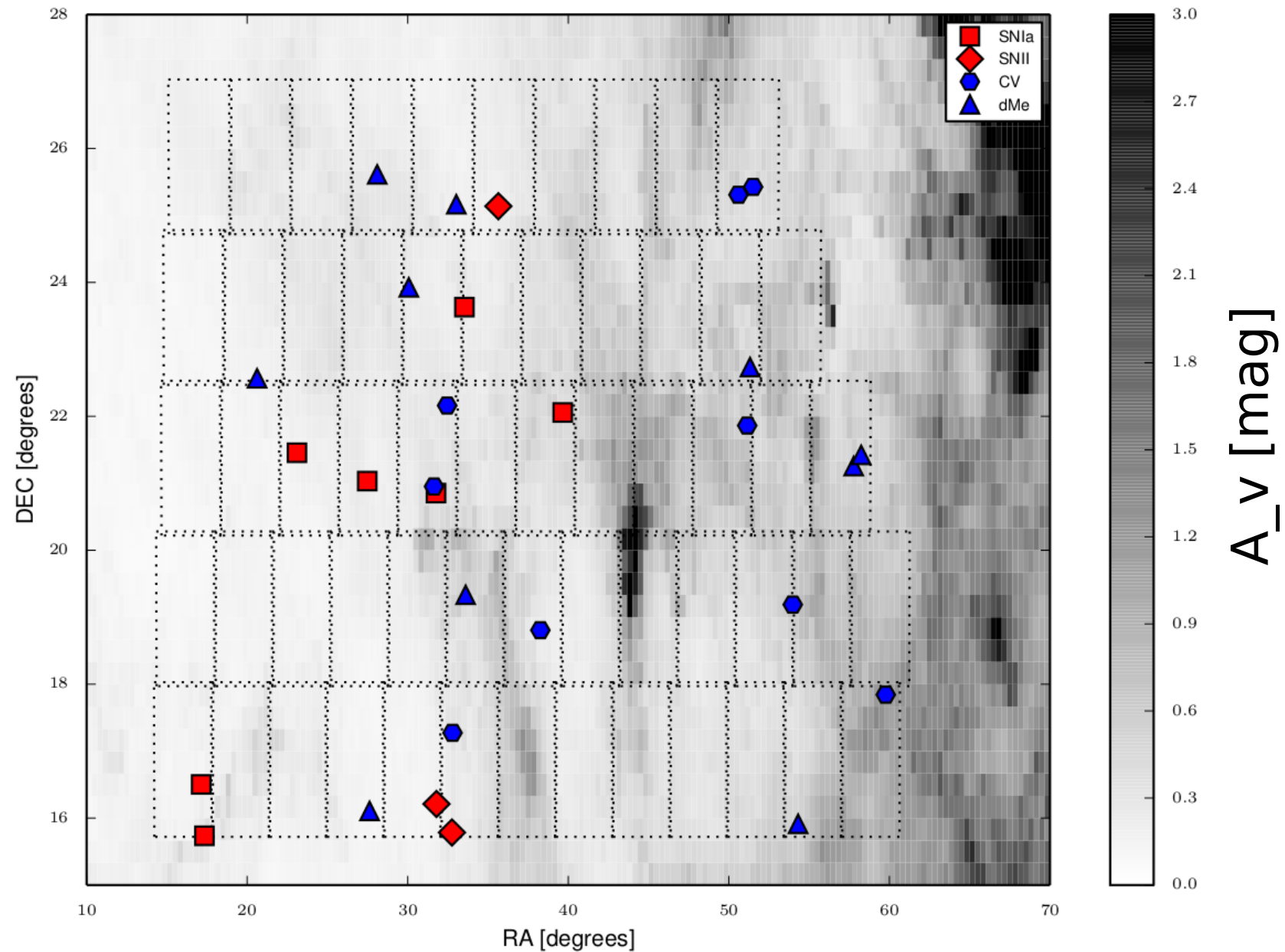
406 Candidate transients

False positives:

- ~100 Stars
- 28 'Rocks'
- ~200 Variable stars

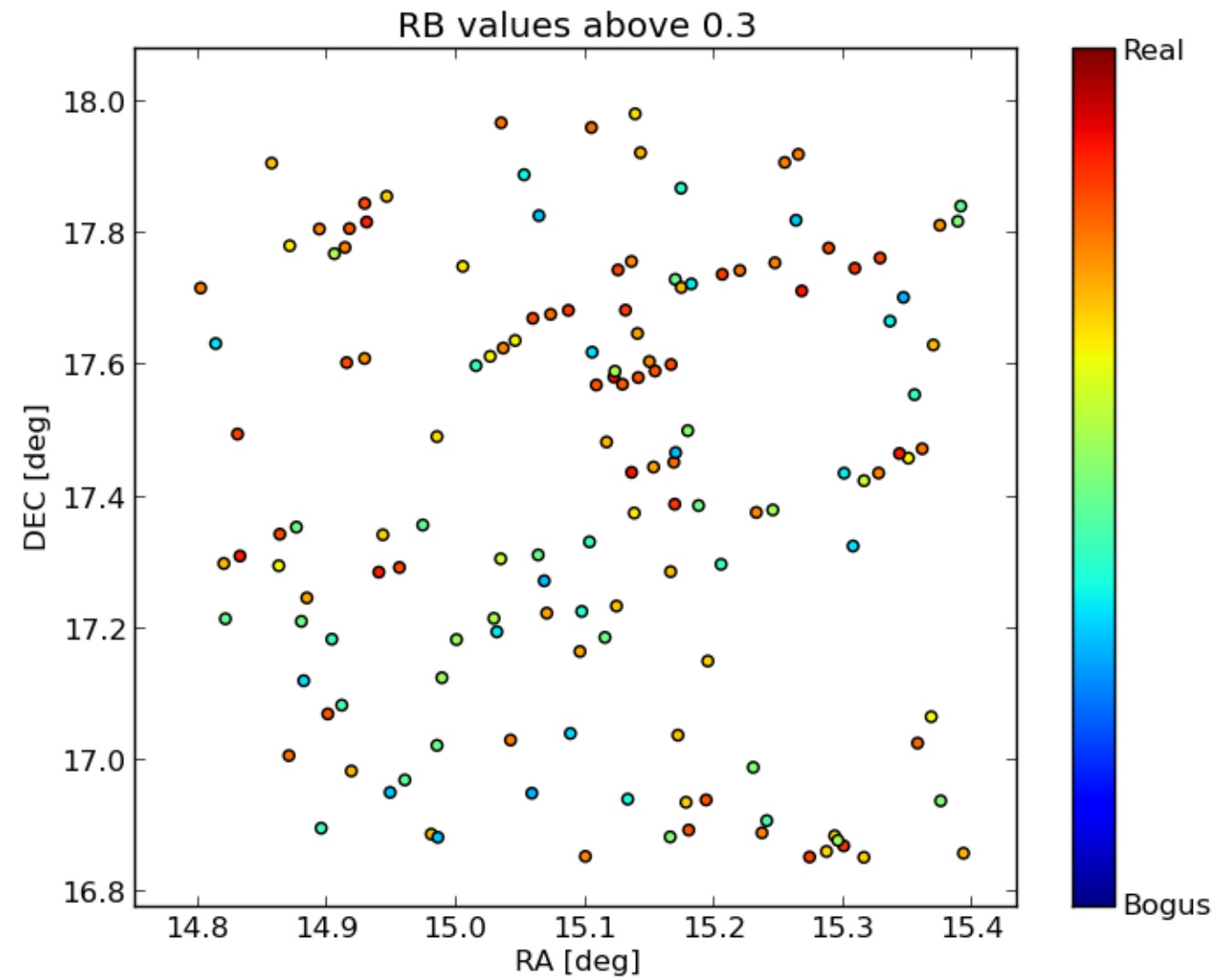
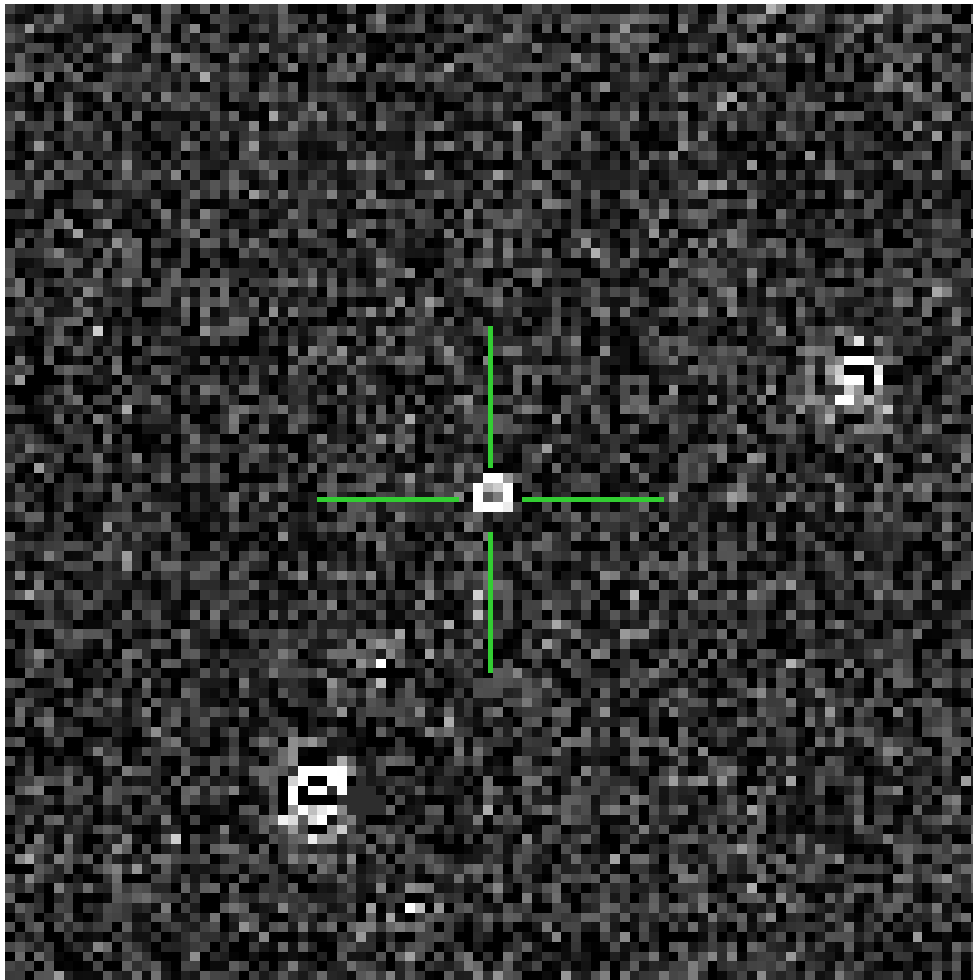
Real Transients:

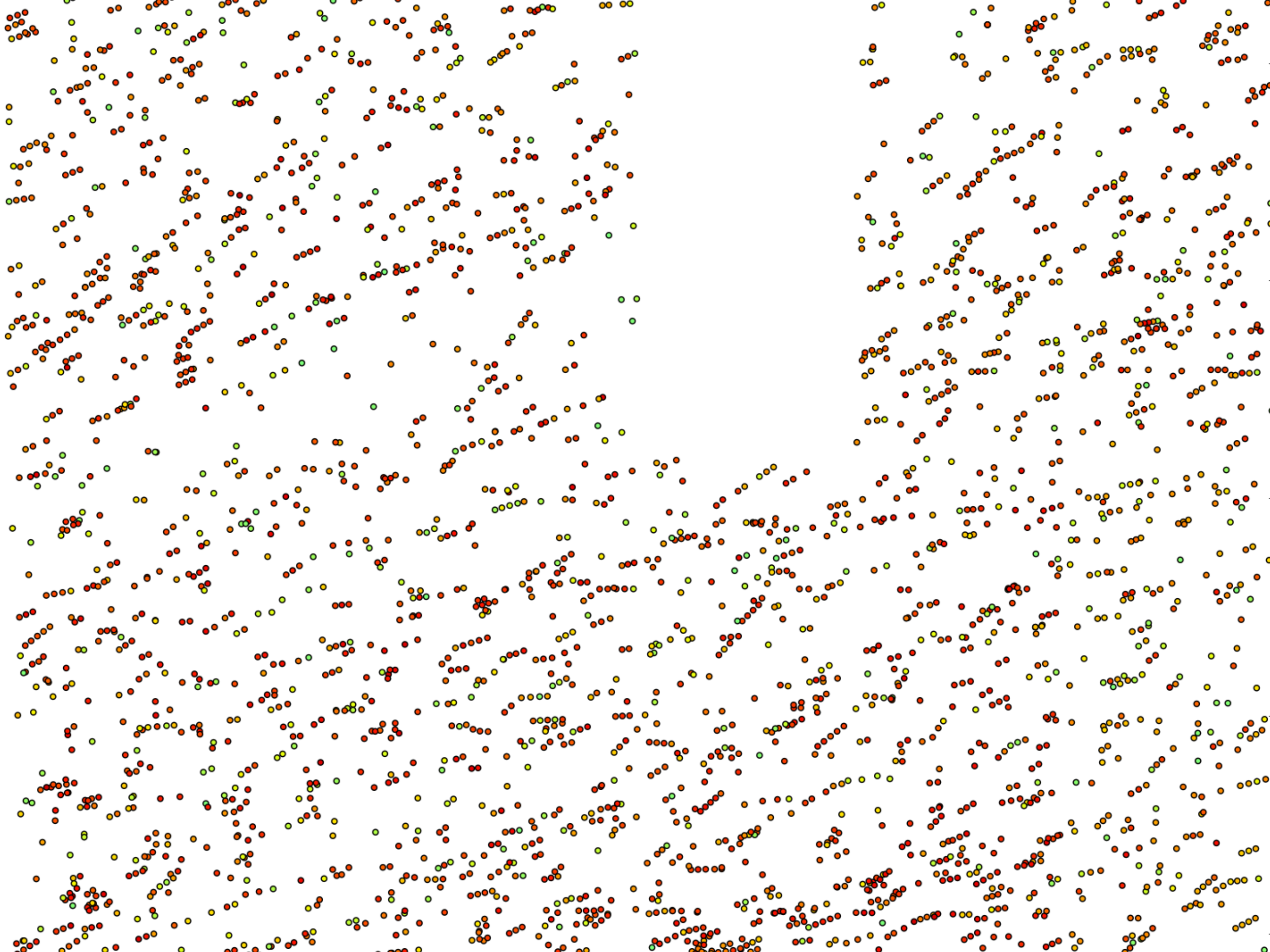
- 9 Outbursting Cvs
- 7 Ia Sne
- 3 CC Sne
- 12 flare stars
- 1 QSO



Sky2night: False positives

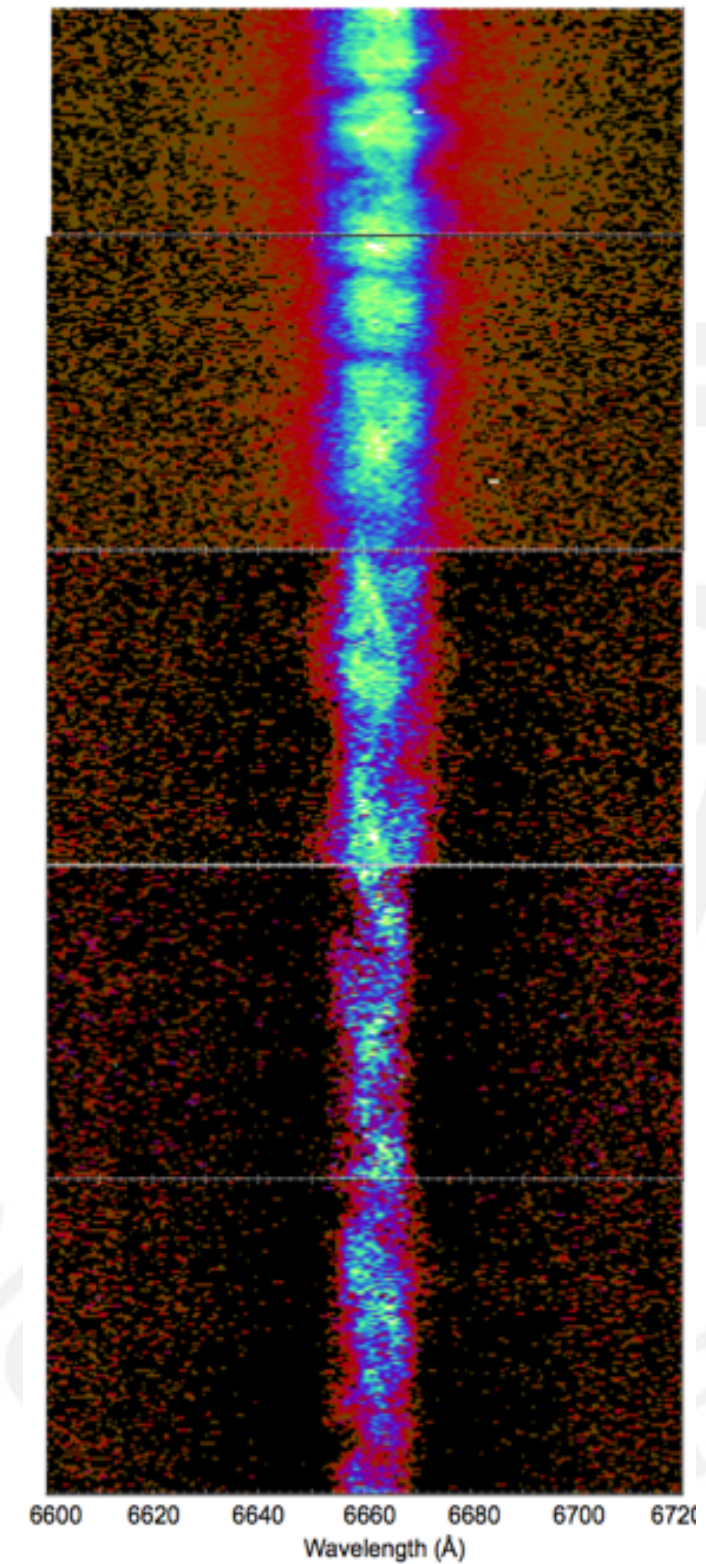
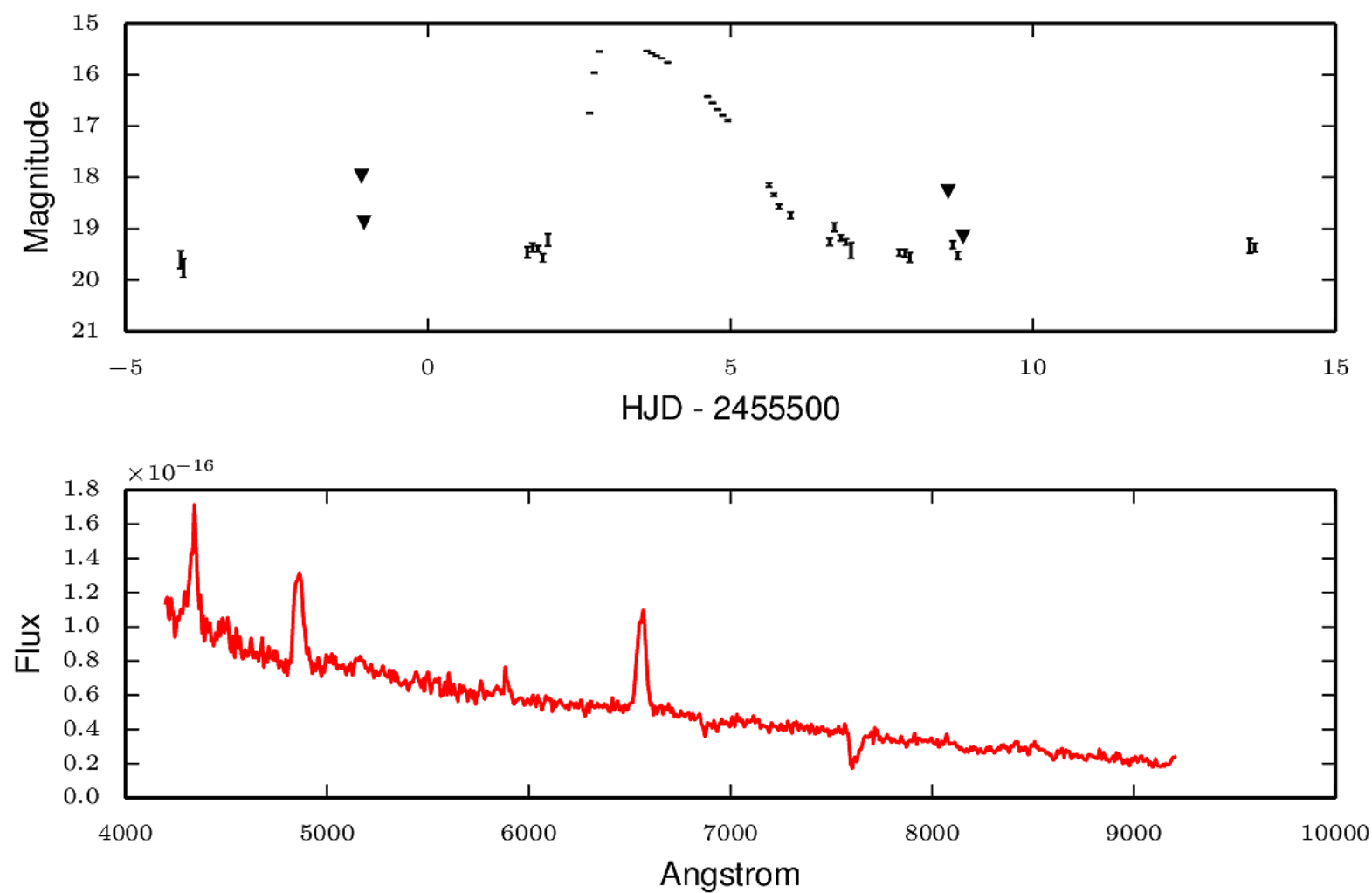
- Asteroids
- Variable stars
- CCD artifacts
- Bad subtractions





Sky2night: Outbursting CV

- 9 events
- Rate = $2.6^{+2.6}_{-1.4} \times 10^{-3} \text{ /deg}^2/\text{d}$ (95% CL)

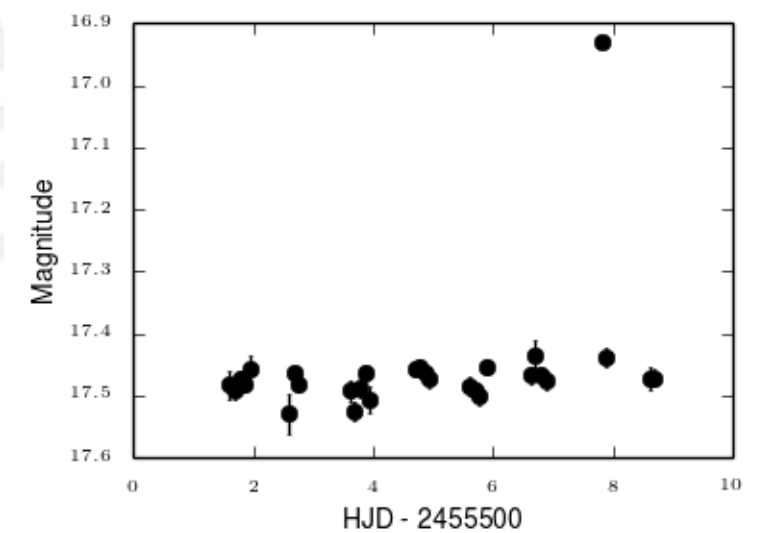
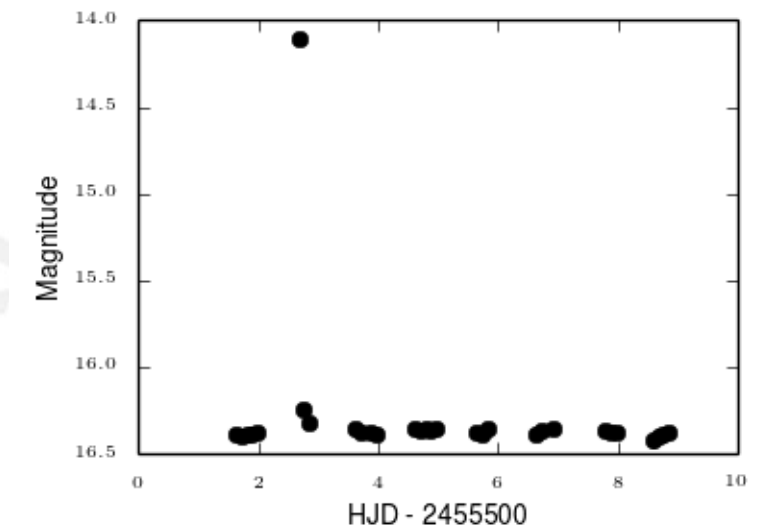
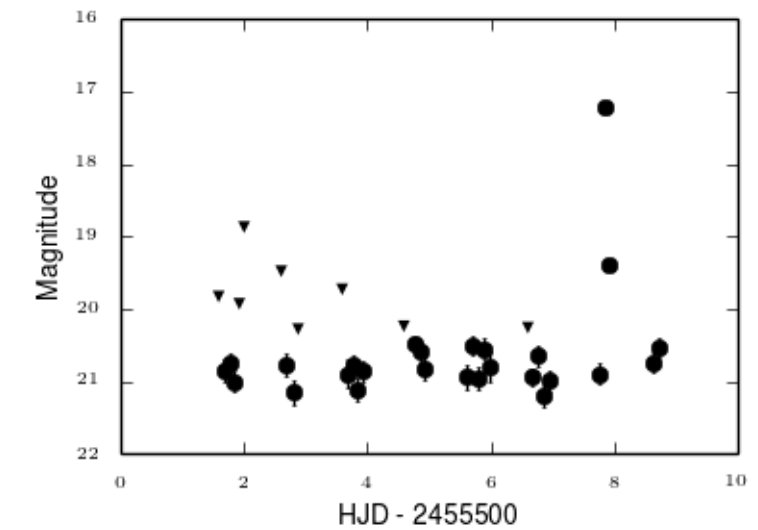
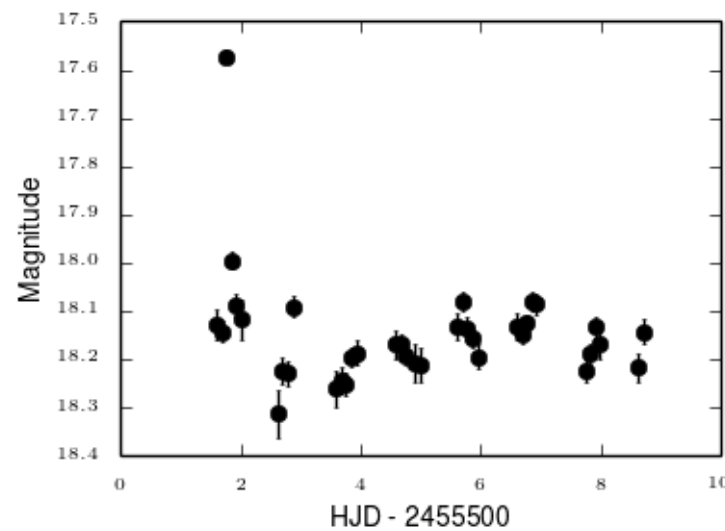
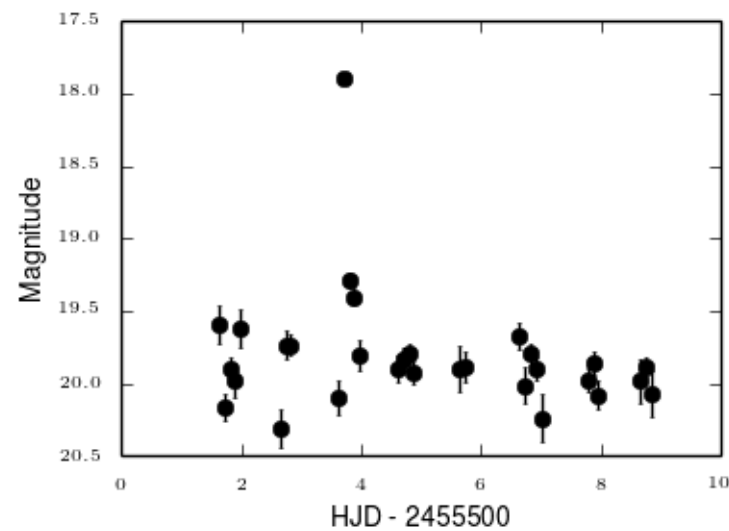


Sky2night: M-dwarf fog

12 flares found and counting...

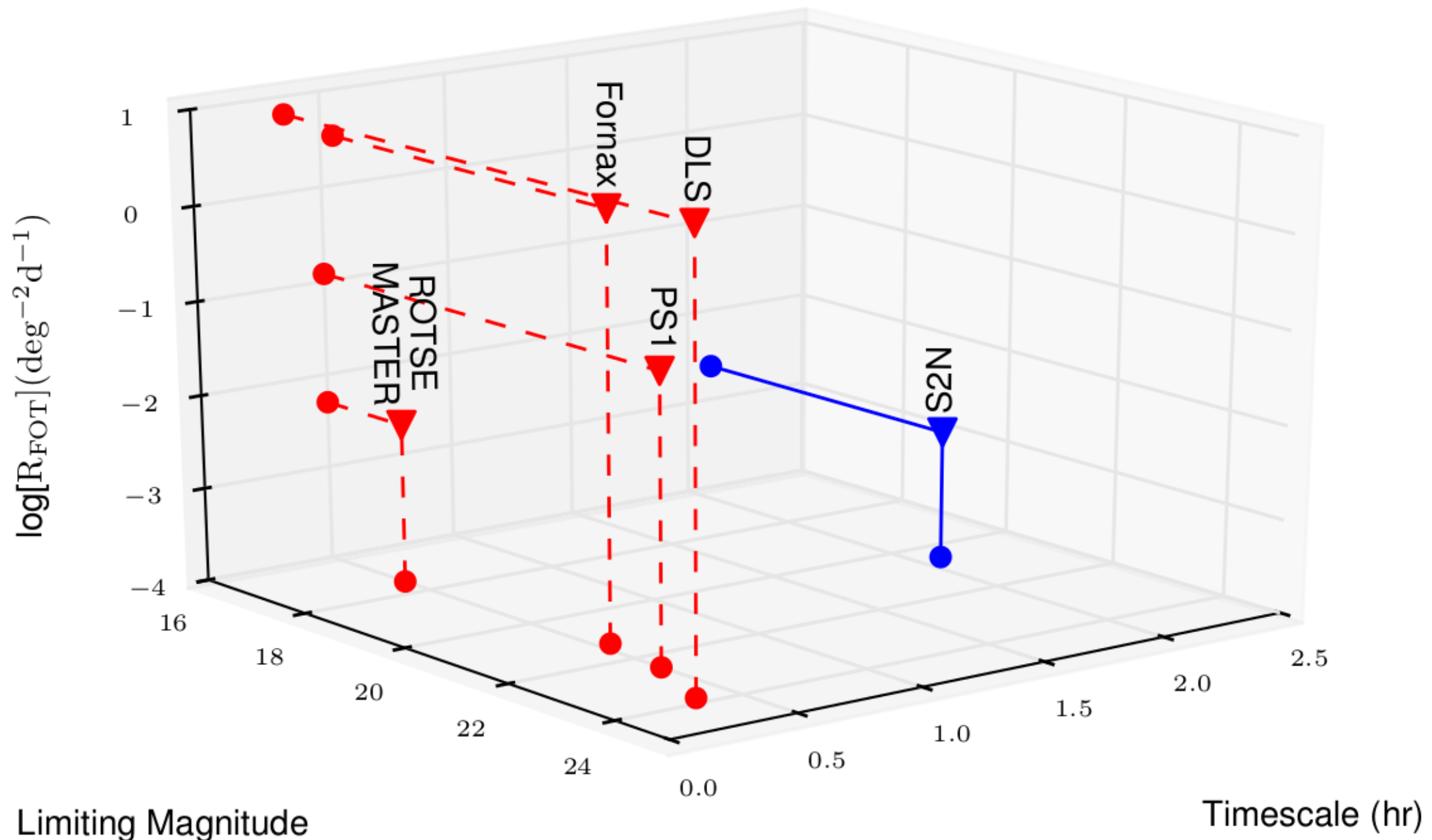
Clearing the fog:

- Deep reference images
- Simultaneous multicolor images



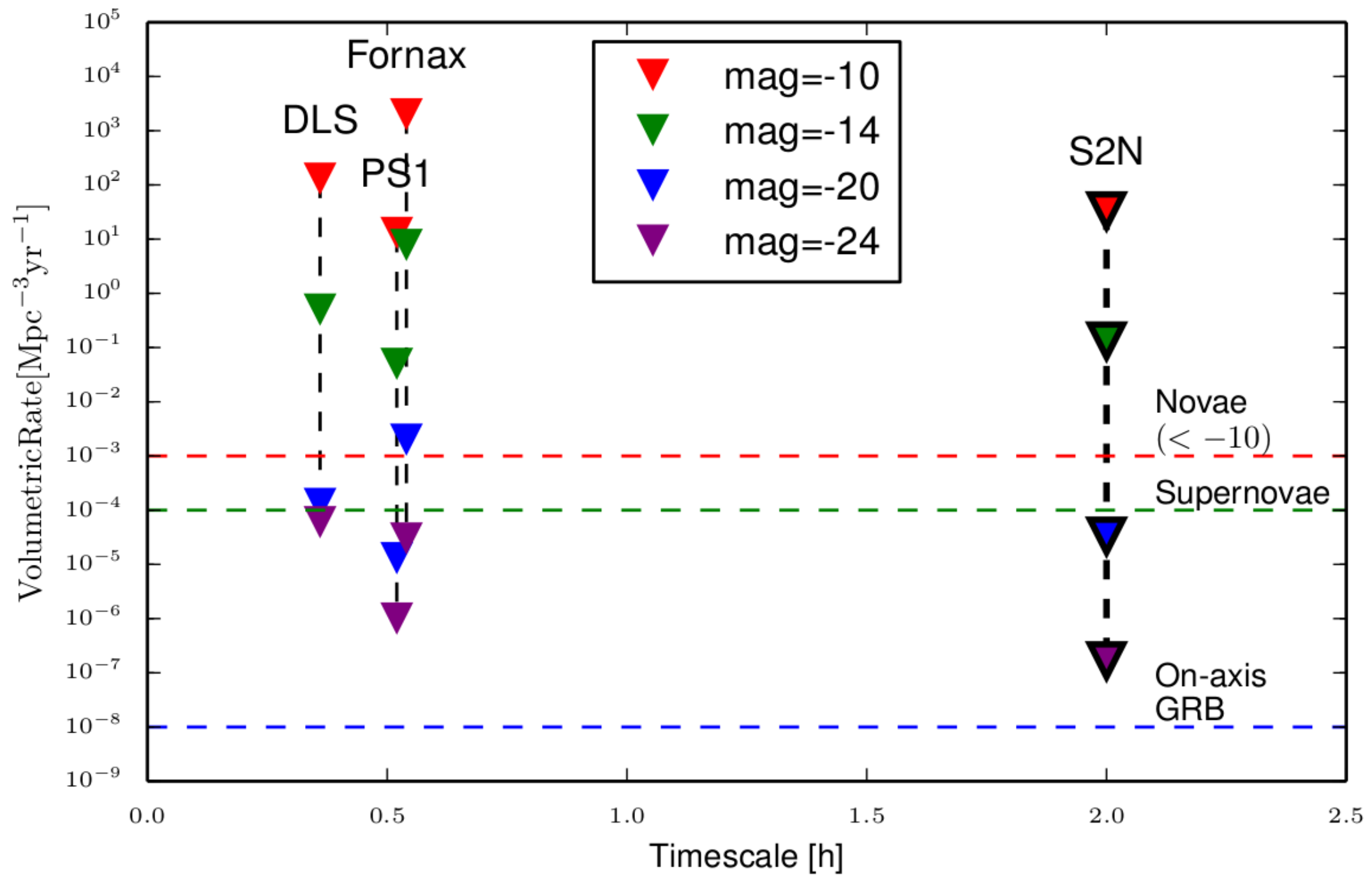
Sky2night: Rate of Fast Optical Transients

S2N Upperlimit: $\sim 4 \cdot 10^{-3}$ /deg²/d (95% CL)



Adapted from Berger et al. 2013

Volumetric Rates

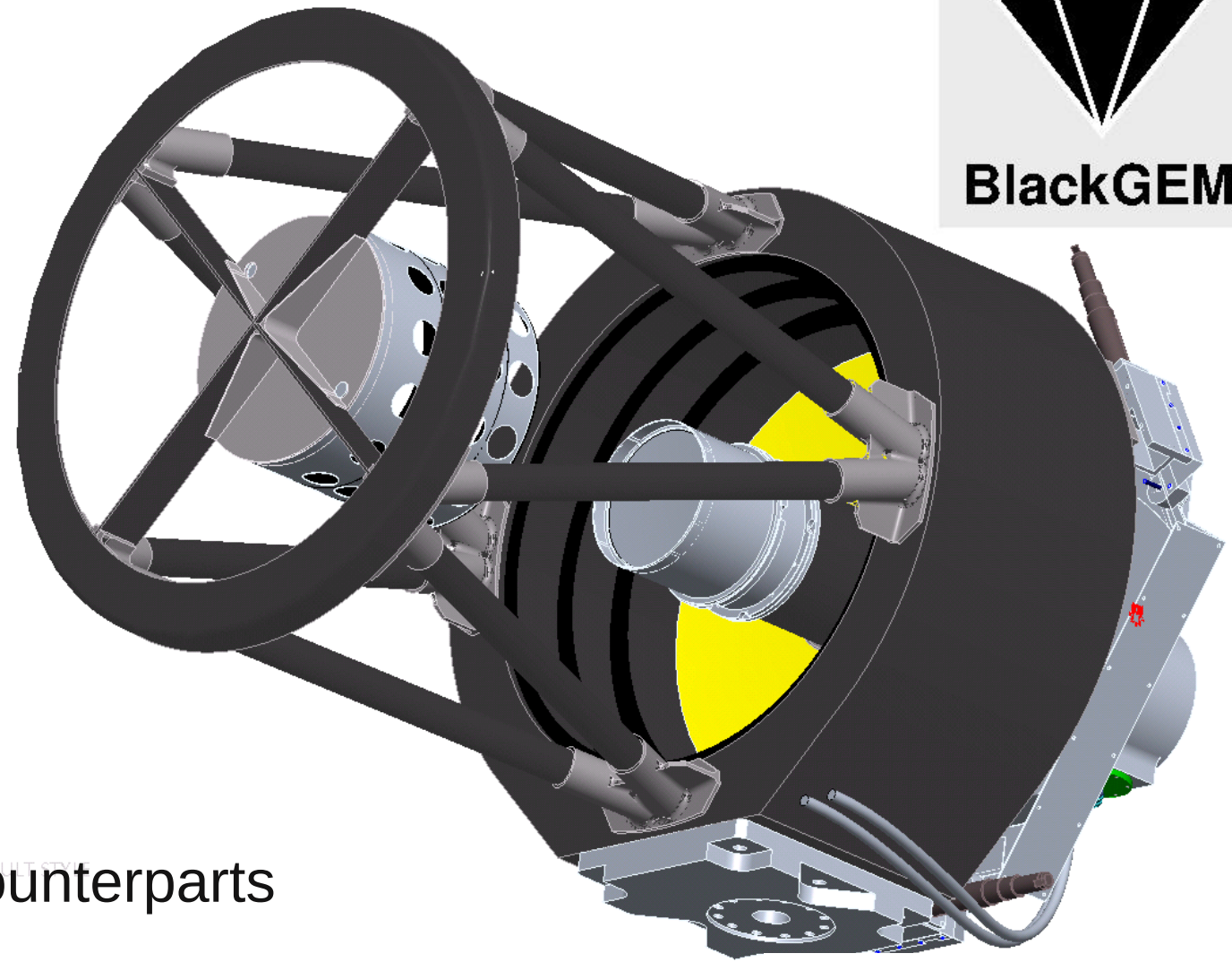


Adapted from Berger et al. 2013

MEERLicht & BlackGem



- Telescope:
- Diameter: 0.60m
 - FOV: 2.7 deg²
 - Pixelscale: 0.56"
 - Filters: ugriz & w



Goal: Finding gravitational wave counterparts

MEERLicht:	Prototype telescope	Feb 2015
BlackGem P1:	4 telescopes	2016
BlackGem P2:	15? telescopes	2017



