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Astronomical Observatory, University of Warsaw

NEW TYPES OF TRANSIENTS IN THE ERA OF ALL-SKY SURVEYS

Woo-cash
Vi-zhi-kov-ski

Pessto

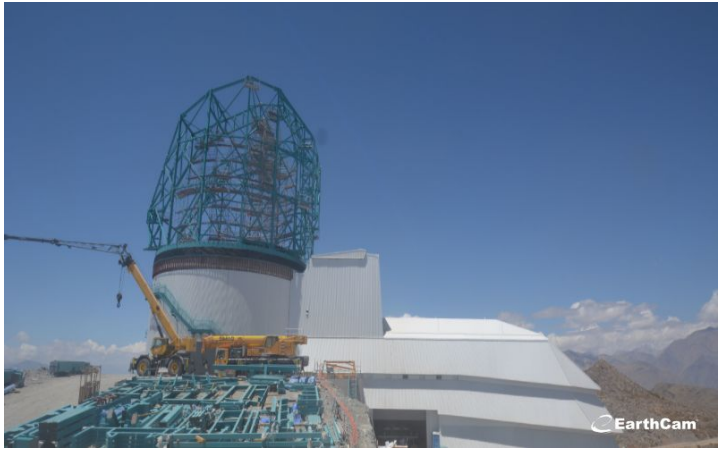
OGLE

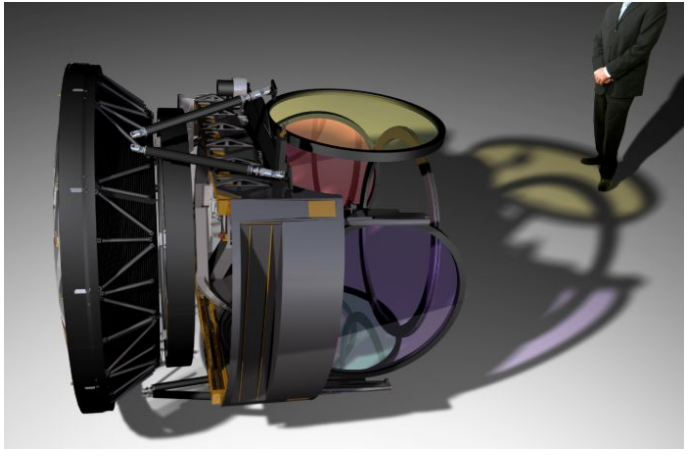
Ingrave

S·A·L·T

10th OPTICON Gaia Science Alerts Workshop, Catania, Italy, 18-20 December 2019

Golden age of the suppliers

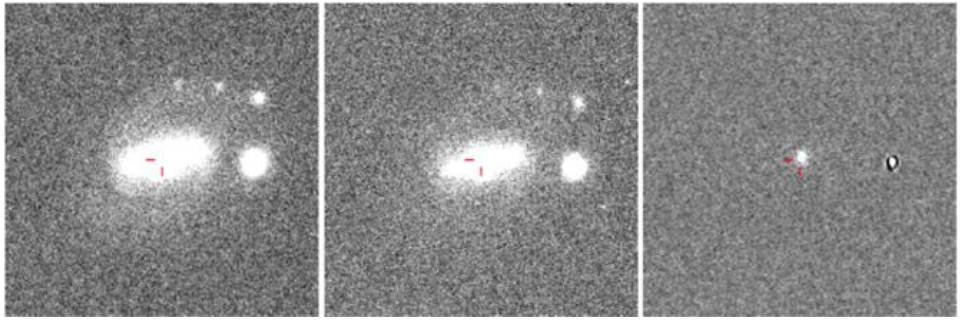




OGLE: father of the Suppliers

… 27 years ago in the Milky Way ...

- 1.3m telescope at LCO
- Limiting mag ~ 22
- Pixel scale 0.26”
- Cover sky fraction ~0.07

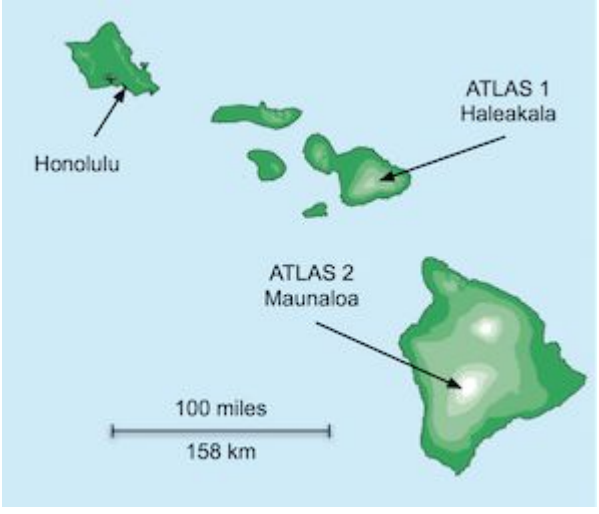


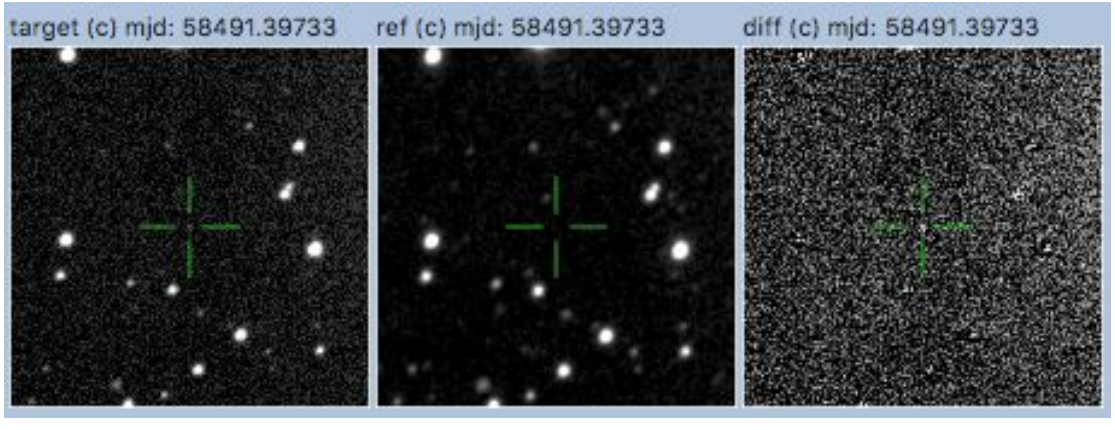
ASAS-SN

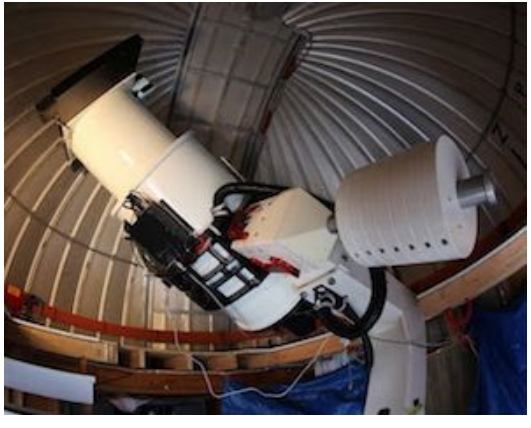
- 6 units (4*14cm lens)
- Limiting mag ~ 18
- Pixel scale 7.8”
- Discovered 888 bright SN

Asteroid Terrestrial-Impact Last Alert System (ATLAS)

Near-Earth Asteroids	254
Potentially Hazardous Asteroids	27
Comets	15
Supernovae	2786

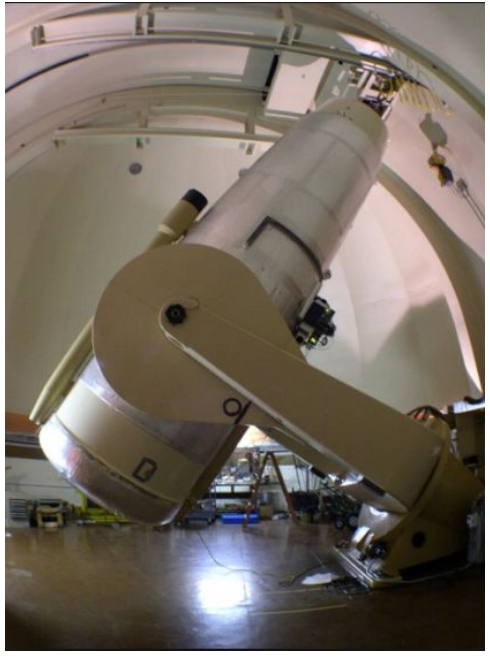


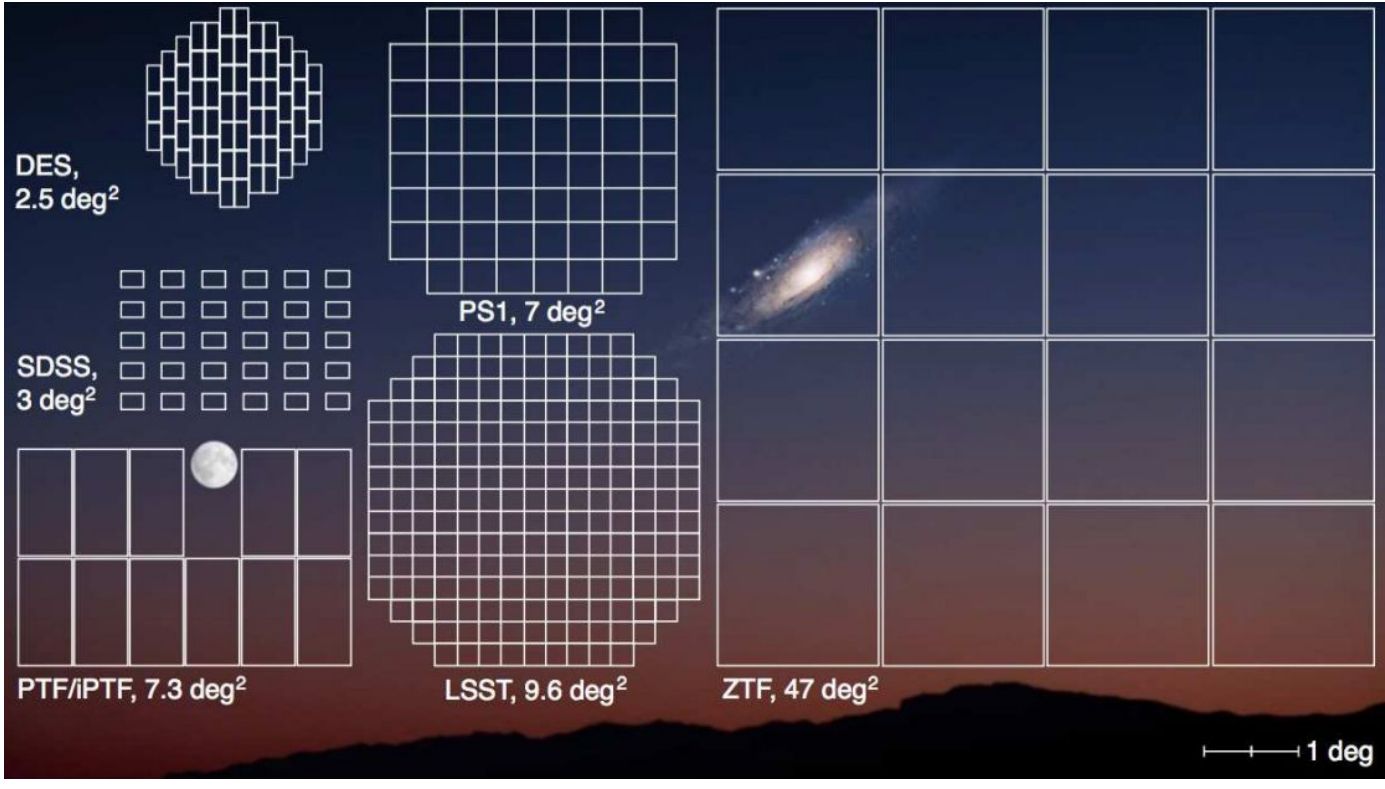




Zwicky Transient Facility (ZTF)

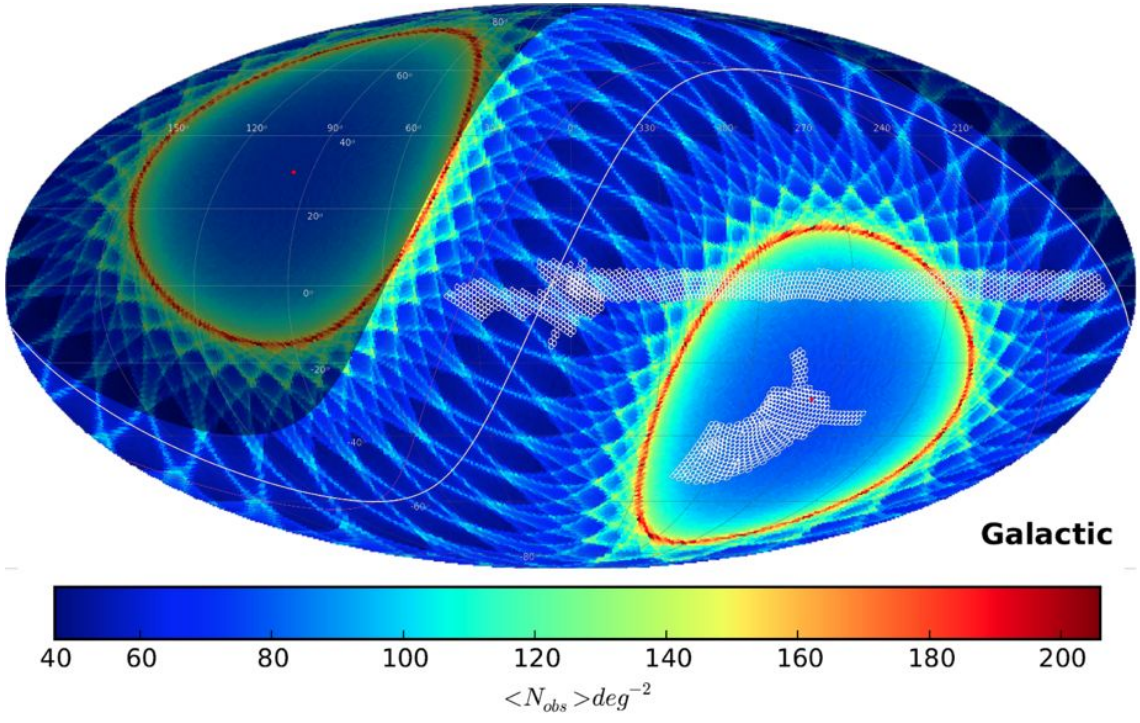
FOV~47sqr.deg
Filters g,r,i
1”/pixel (seeing ~2”)

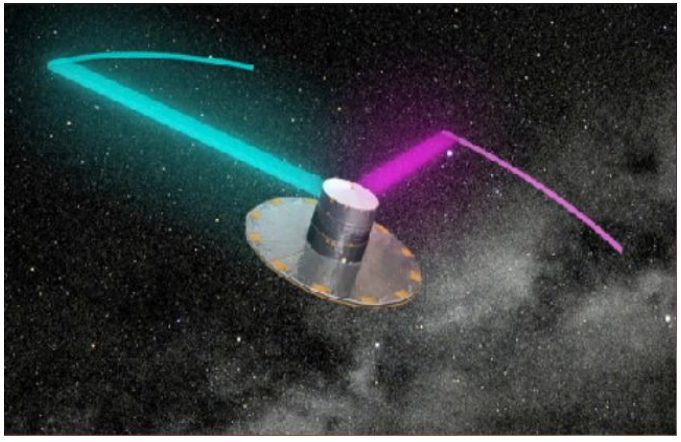


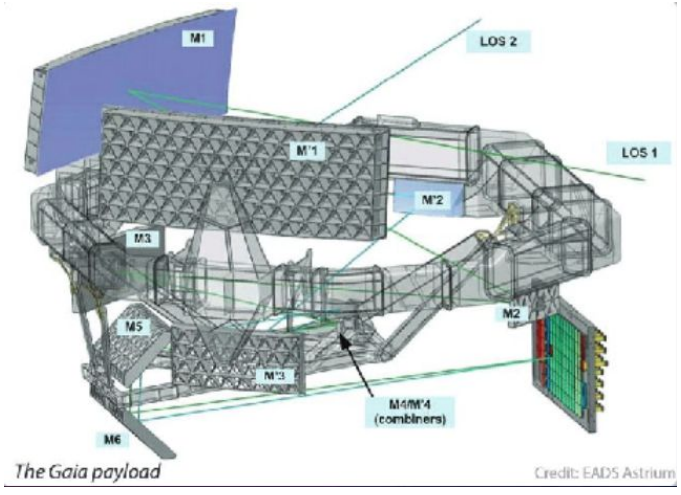


Samuel Oschin telescope
3750 sqr.deg per hour, range ~ 20.4 mag

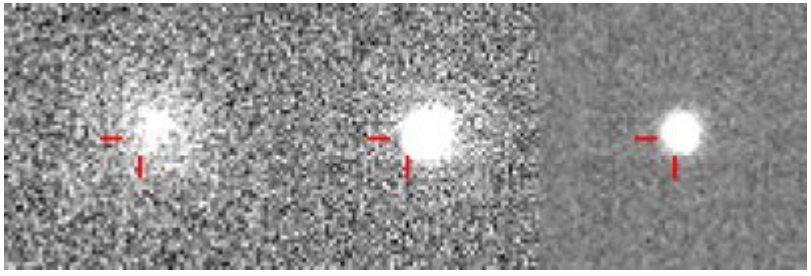
Gaia

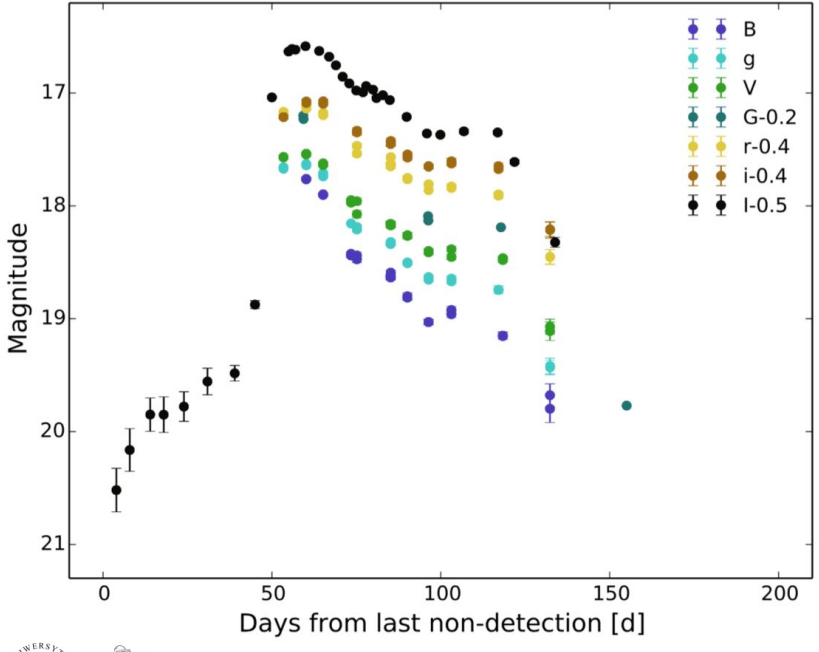

Galactic
40
60
80
100
120
140
160
180
200
$<N_{obs}>deg^{-2}$

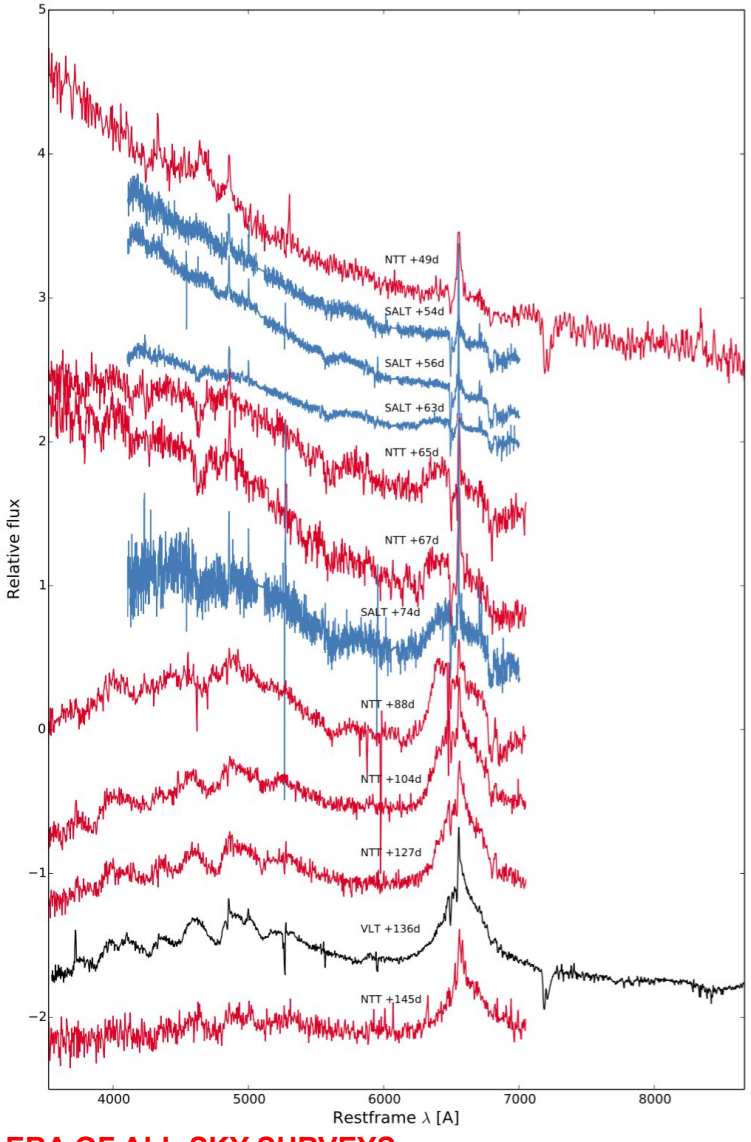



M1
LOS 2
M'1
LOS 1
M'2
M3
M2
M5
M'3
M4/M'4
(combiners)
M6
The Gaia payload
Credit: EADS Astrium

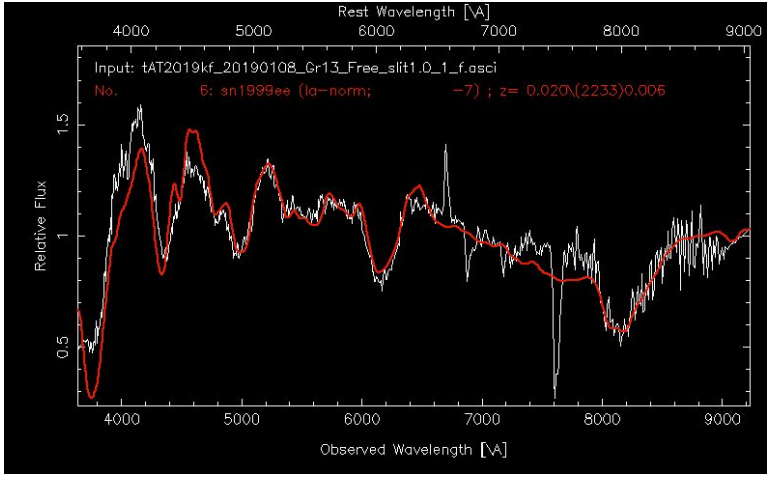
OGLE17jei

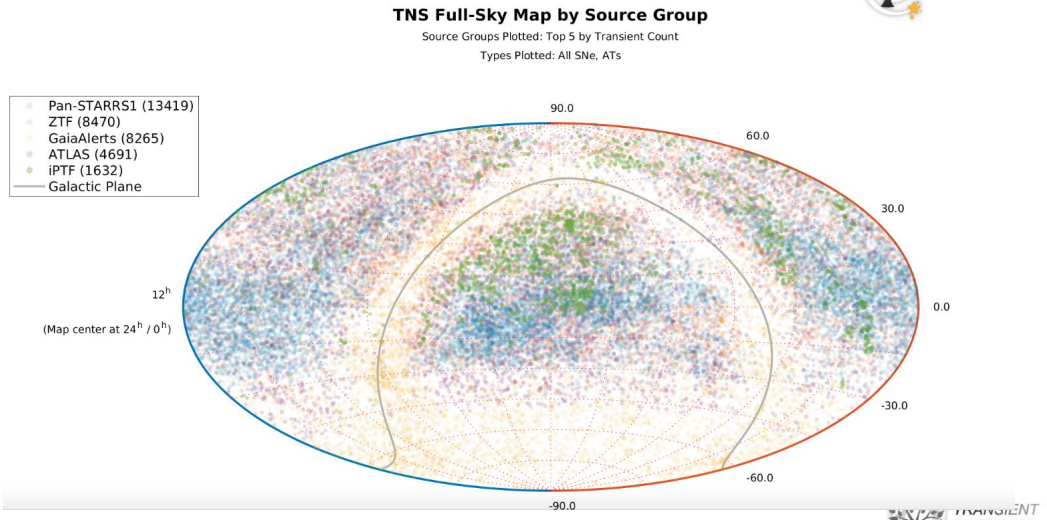


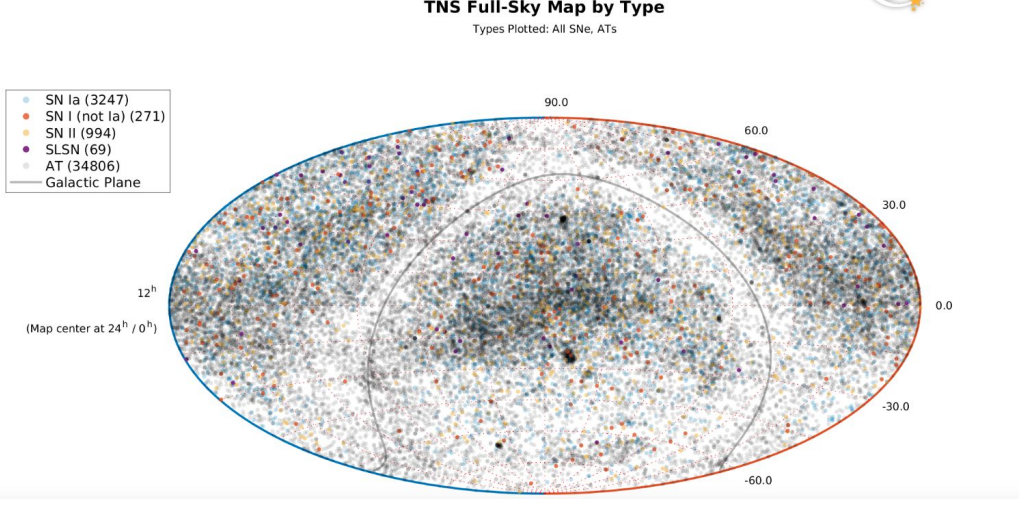

B
g
V
G-0.2
r-0.4
i-0.4
I-0.5
Magnitude
Days from last non-detection [d]
17
18
19
20
21
0
50
100
150
200


NTT +49d
SALT +54d
SALT +56d
SALT +63d
NTT +65d
NTT +67d
SALT +74d
NTT +88d
NTT +104d
NTT +127d
VLT +136d
NTT +145d
Relative flux
Restframe λ [A]
4000
5000
6000
7000
8000

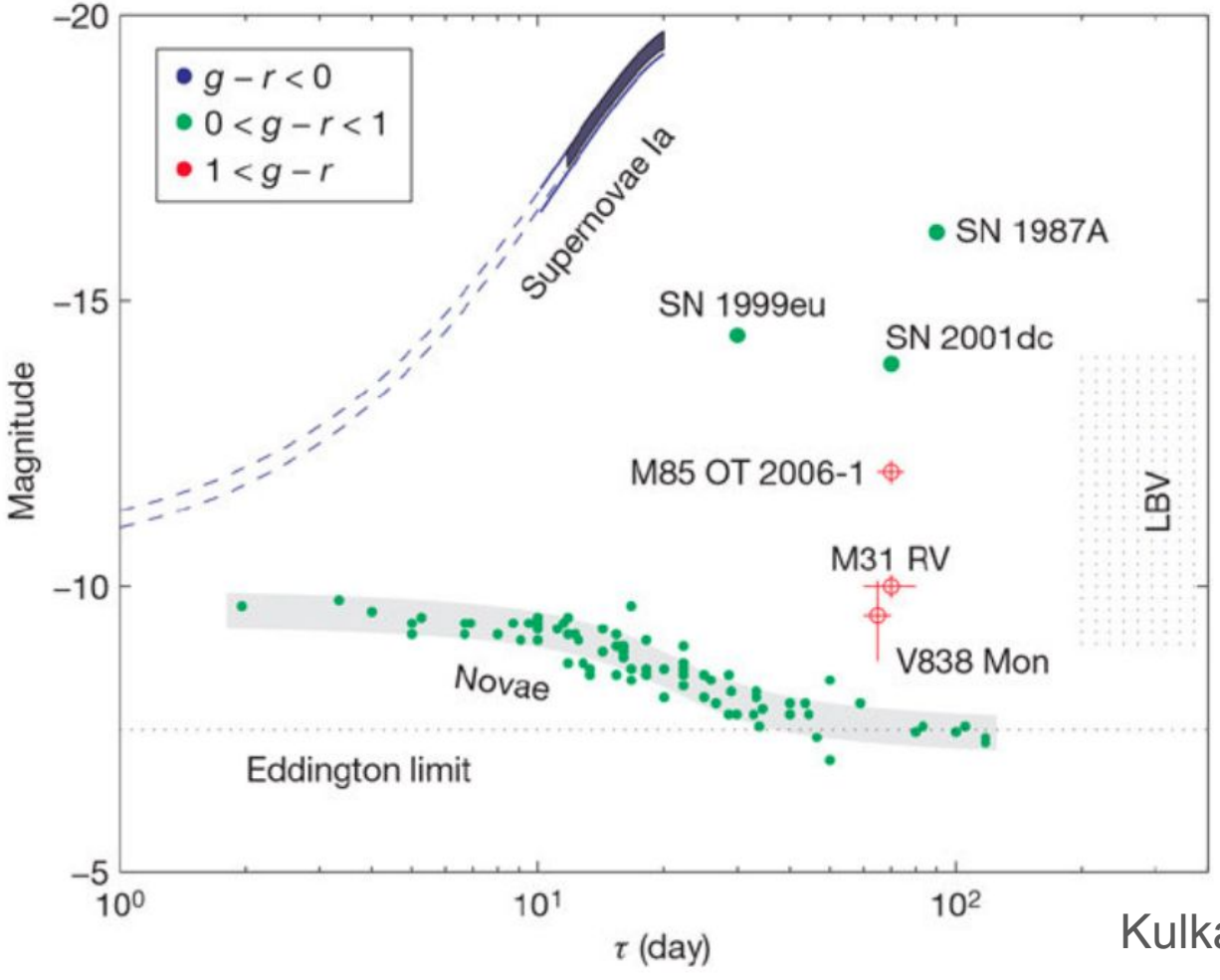
Main type of transients





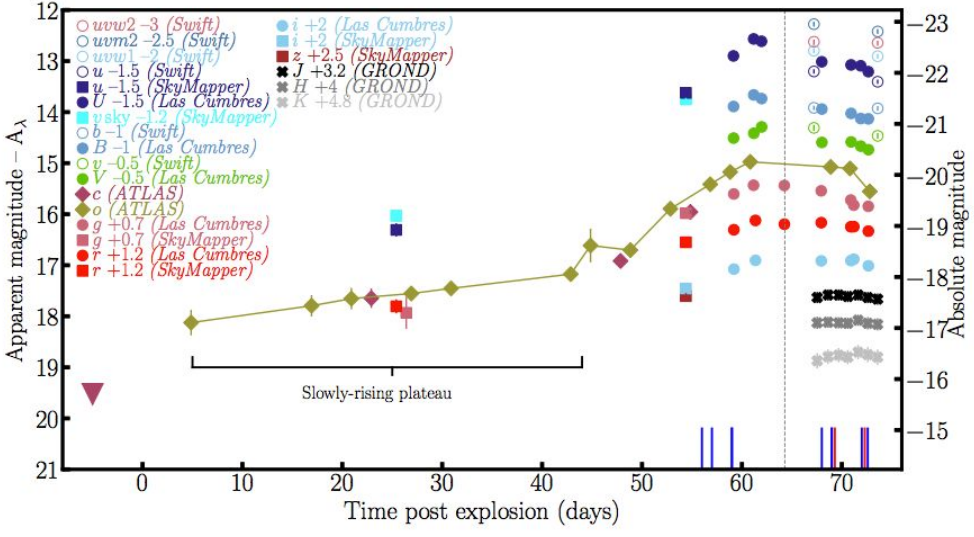


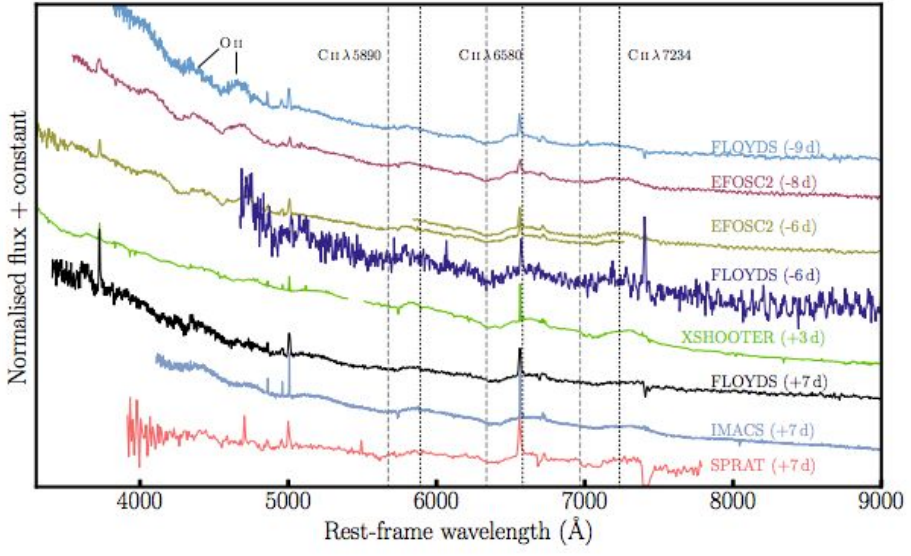
PHASE SPACE OF COSMIC TRANSIENTS



Kulkarni et al. 2007

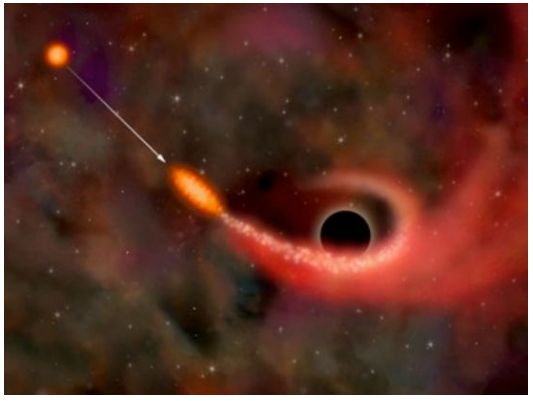
SN 2018bsz - the closest SLNS



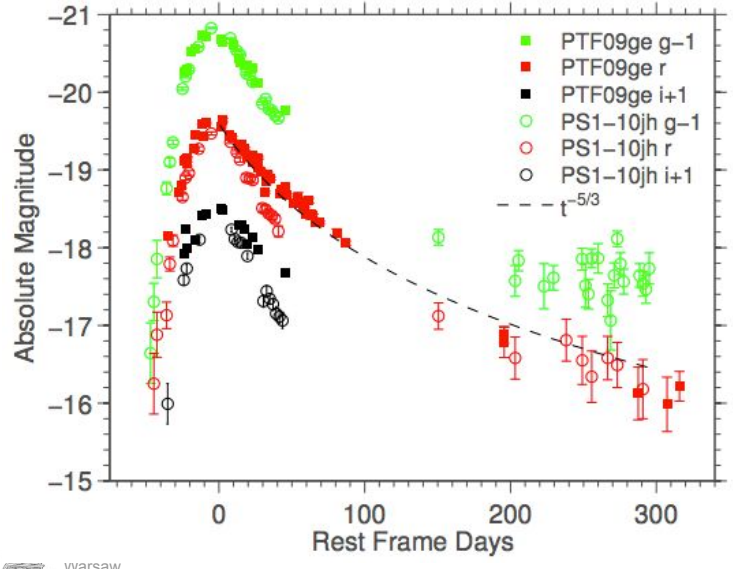


Anderson et al. 2018

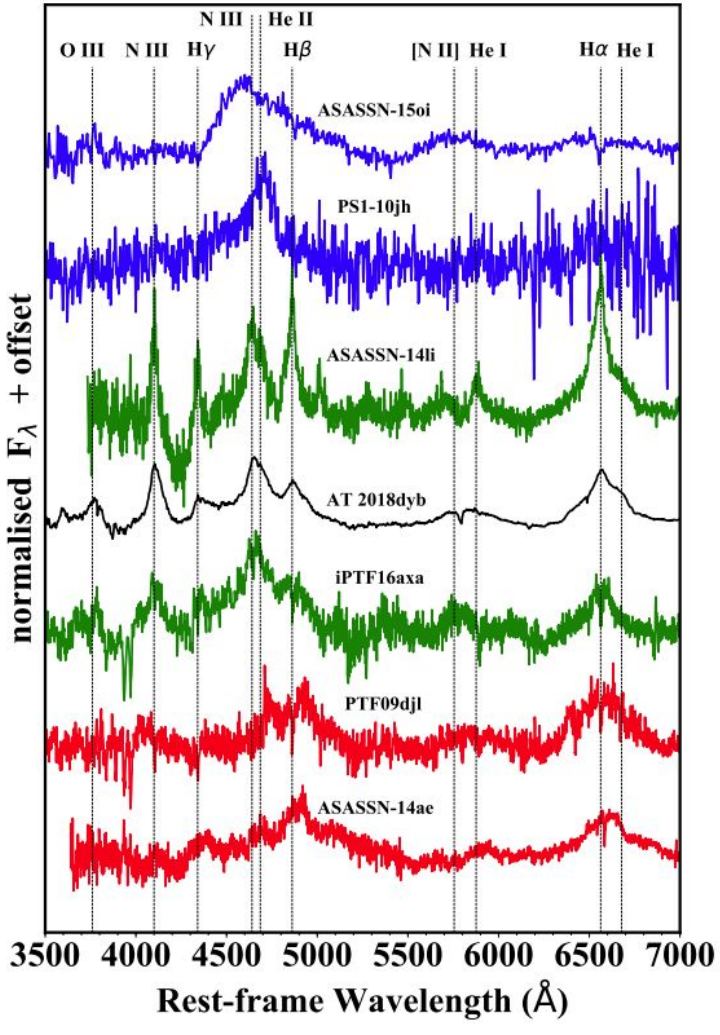
Tidal Disruption Event (TDE)



Arcavi et al. 2014



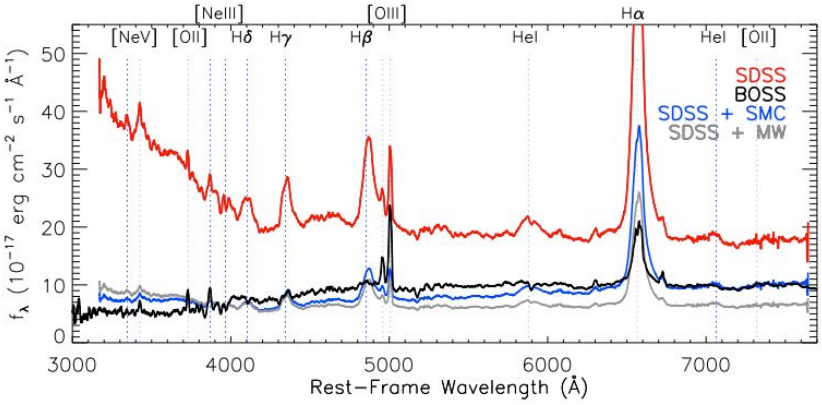
Leloudas et al. 2019

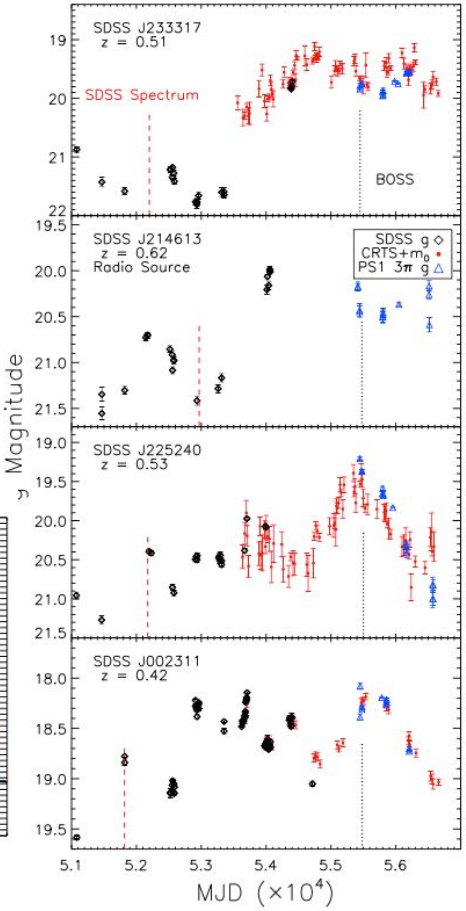


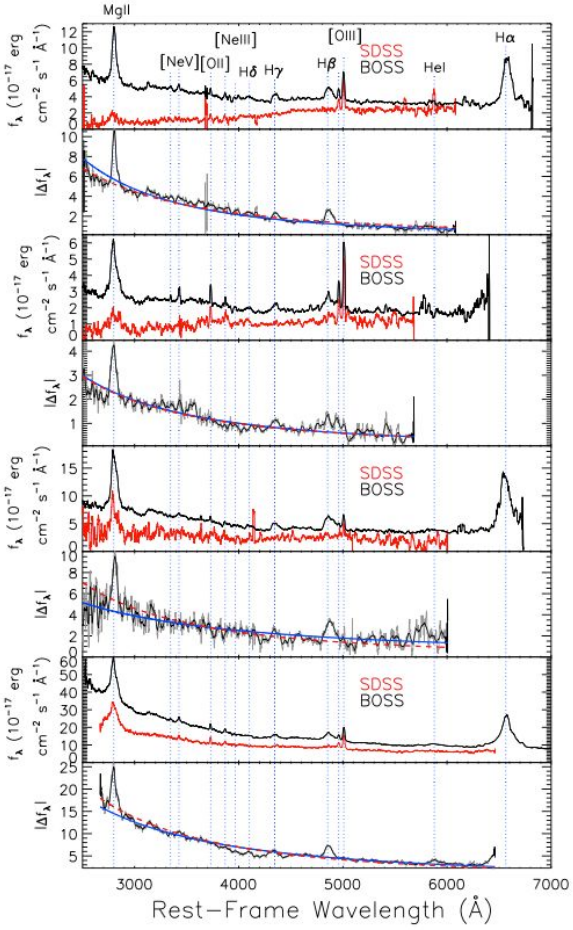
Changing-look AGNs

MacLeod et al. 2016

First CL-AGN were discovered by La Massa et al. 2015 in SDSS data.

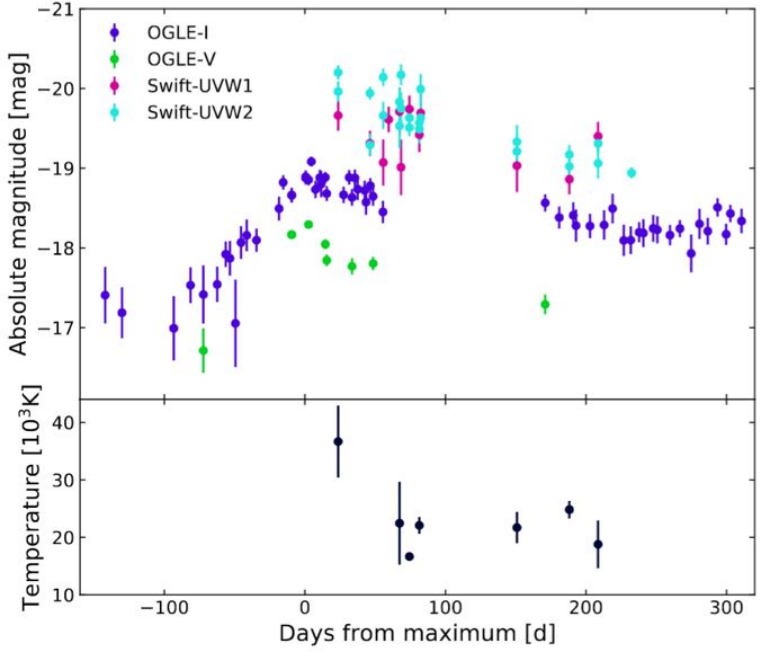




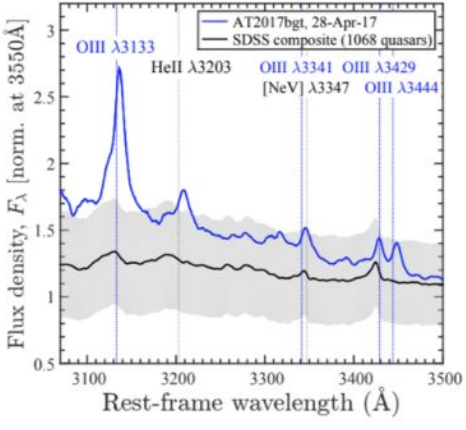


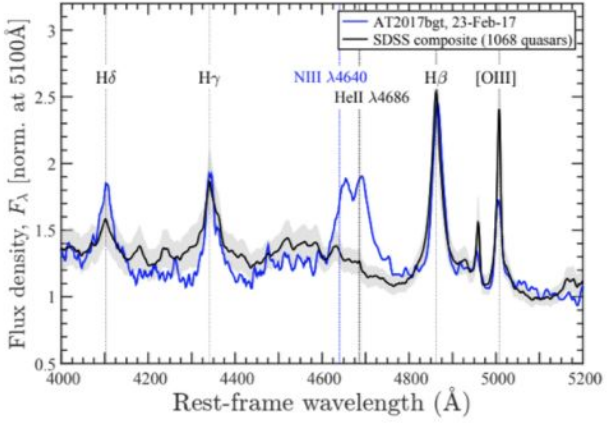
AT 2017bgt OGLE17aaj Gaia19axp F01004-2237

Gromadzki et al. 2019



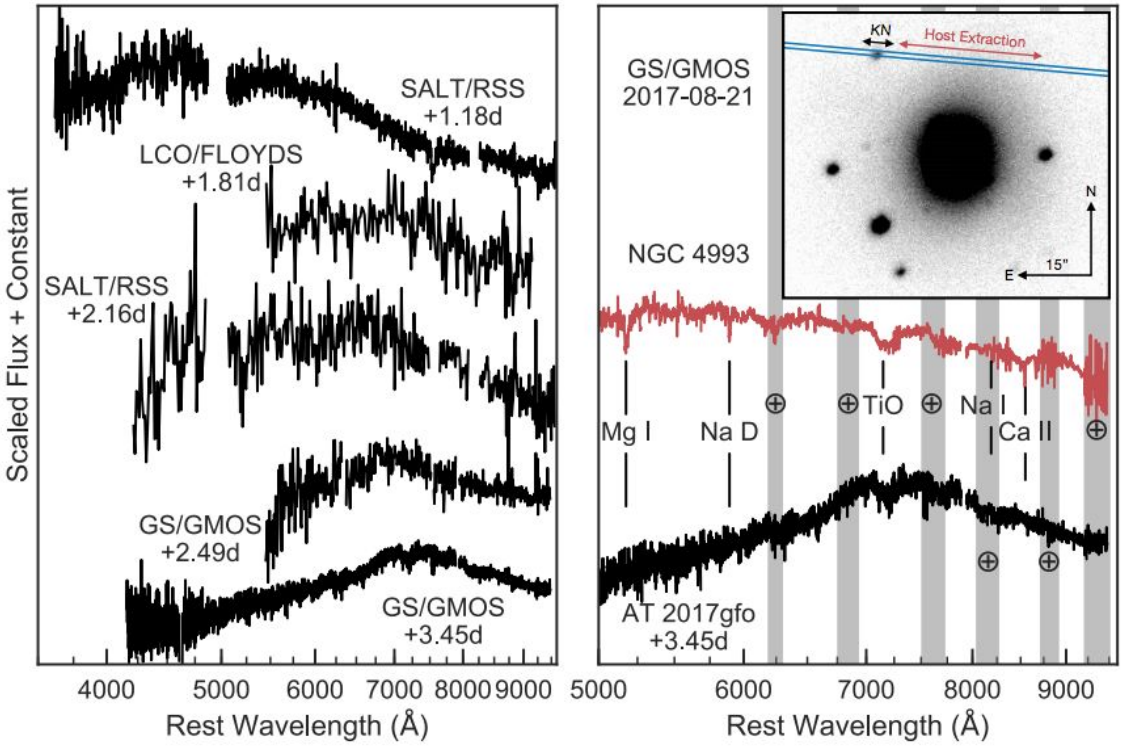
Trakhtenbrot et al. 2019



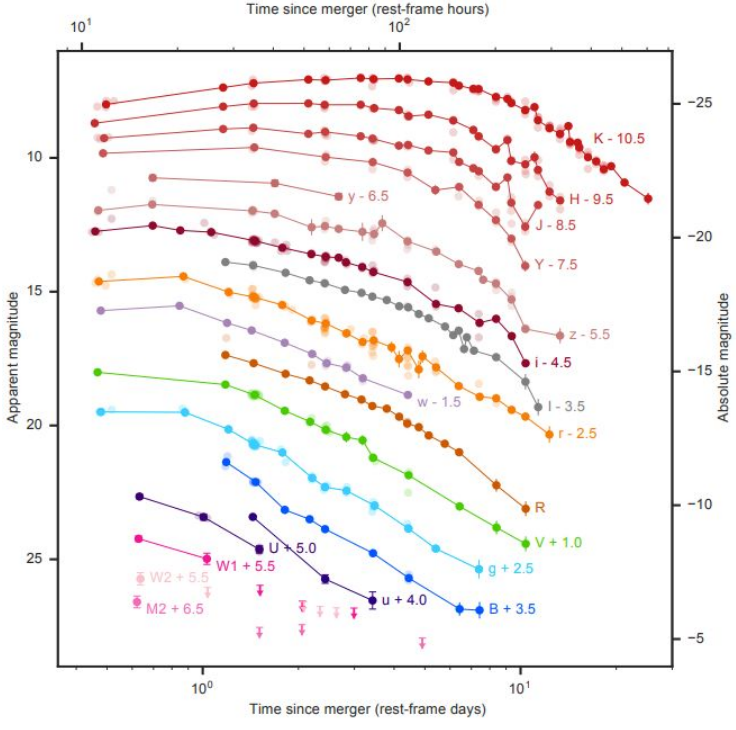


Ihanec et al. in prep

AT 2017gfo

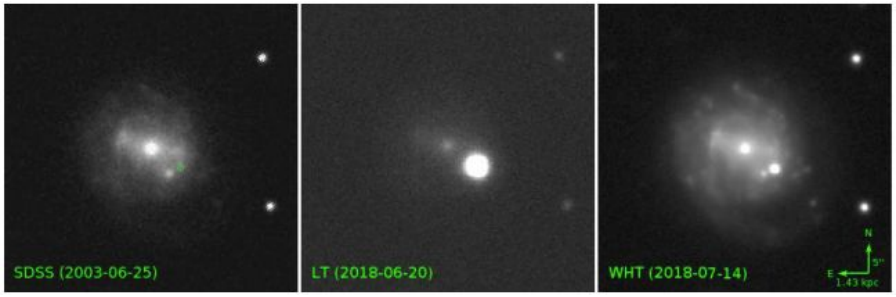


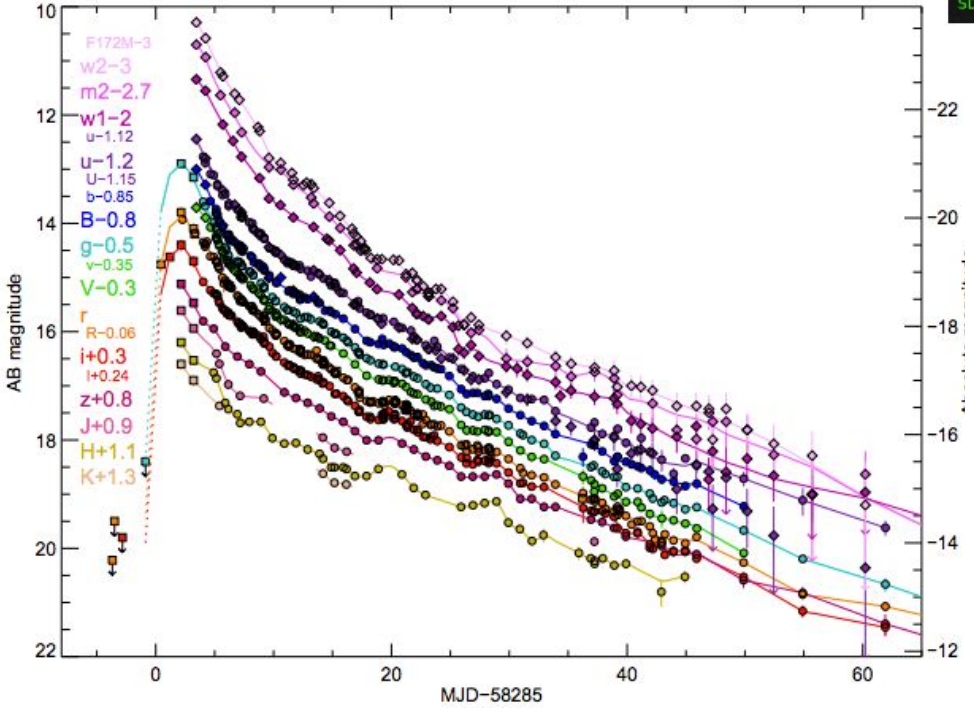
McCully et al. 2017

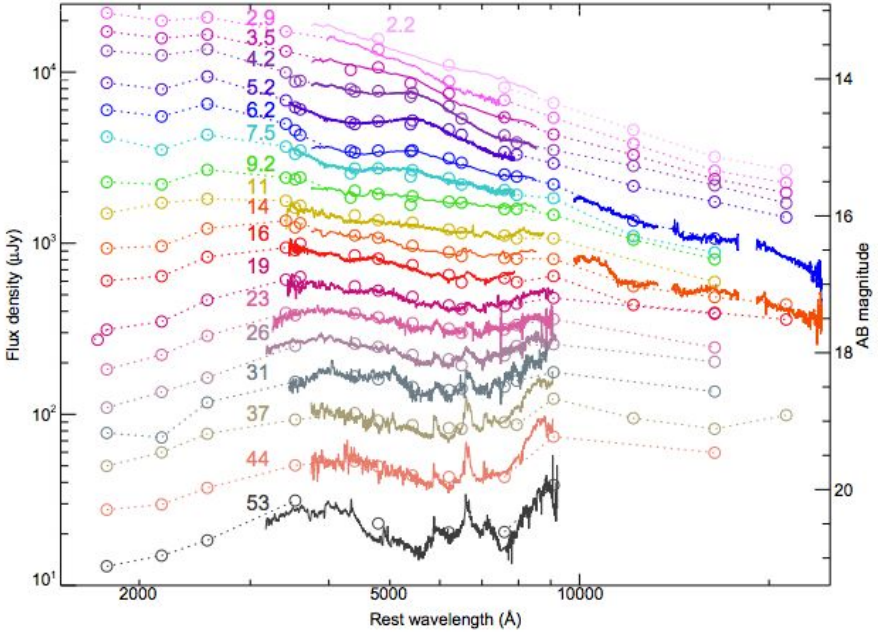


Arcavi 2018

AT 2018cow



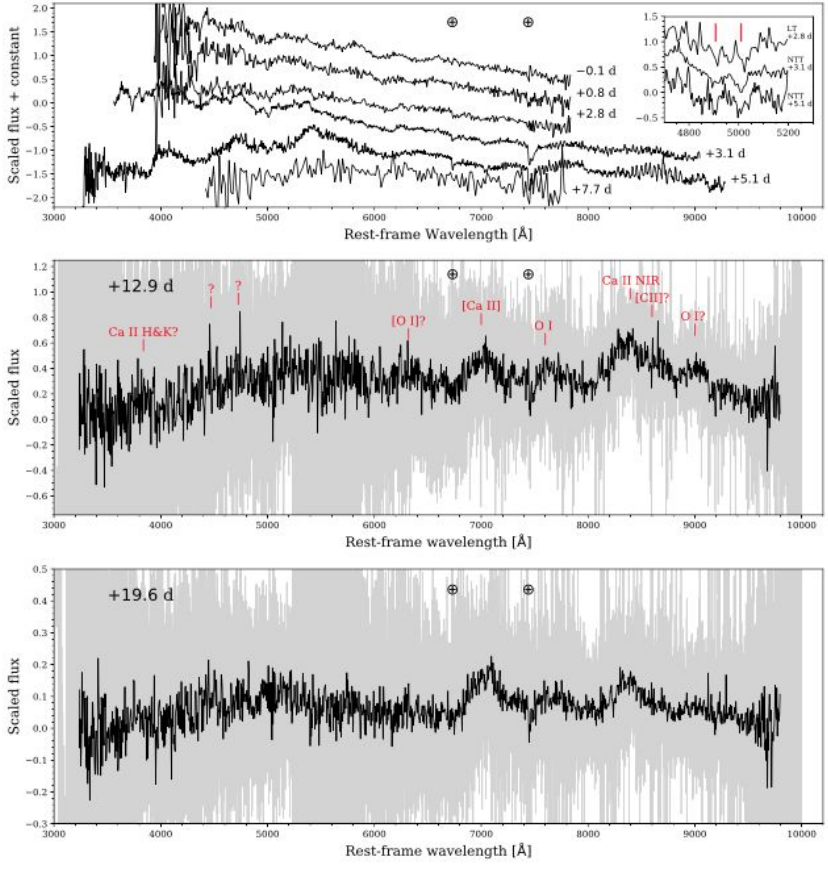




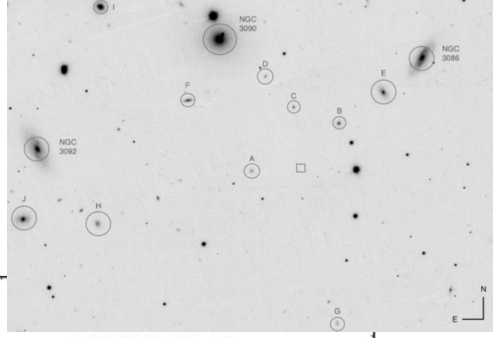
Perley et al. 2018

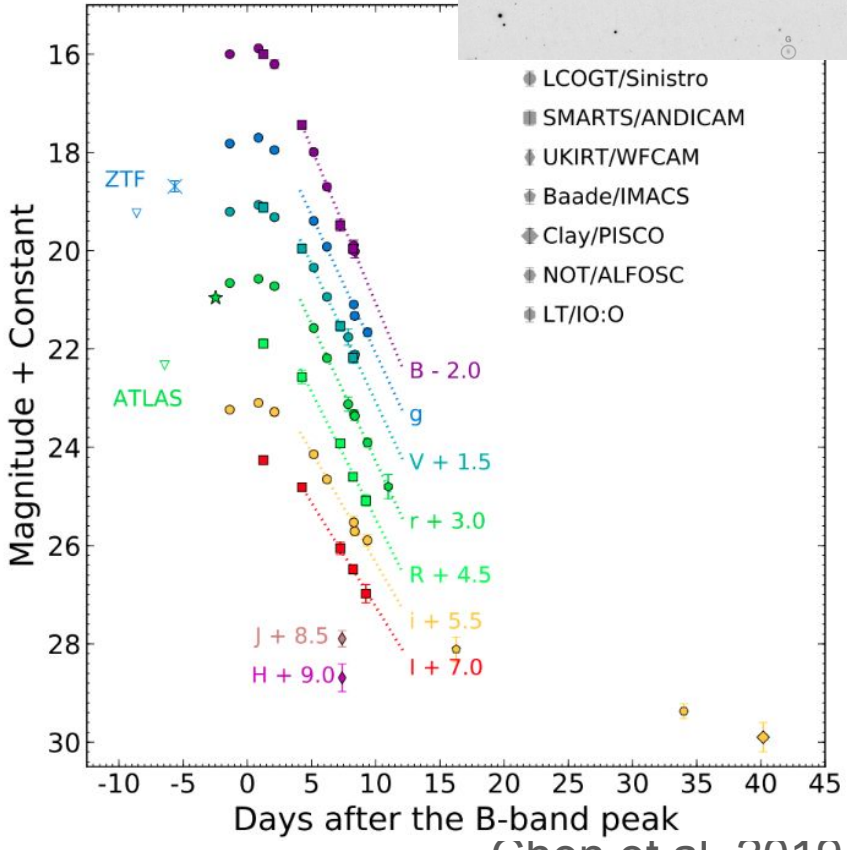
Prentice et al. 2019

SN 2019bkc



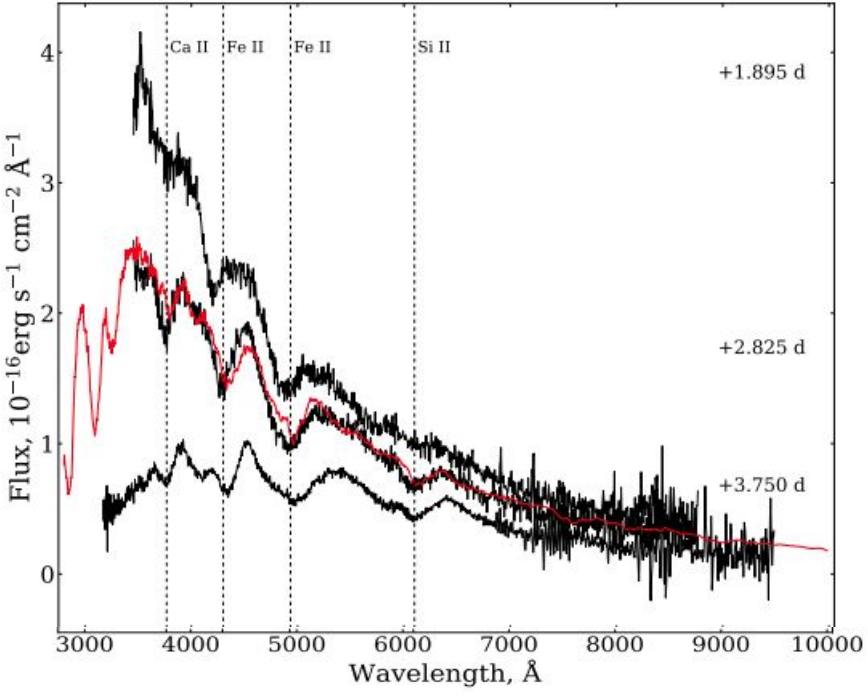
Prentice et al. 2019

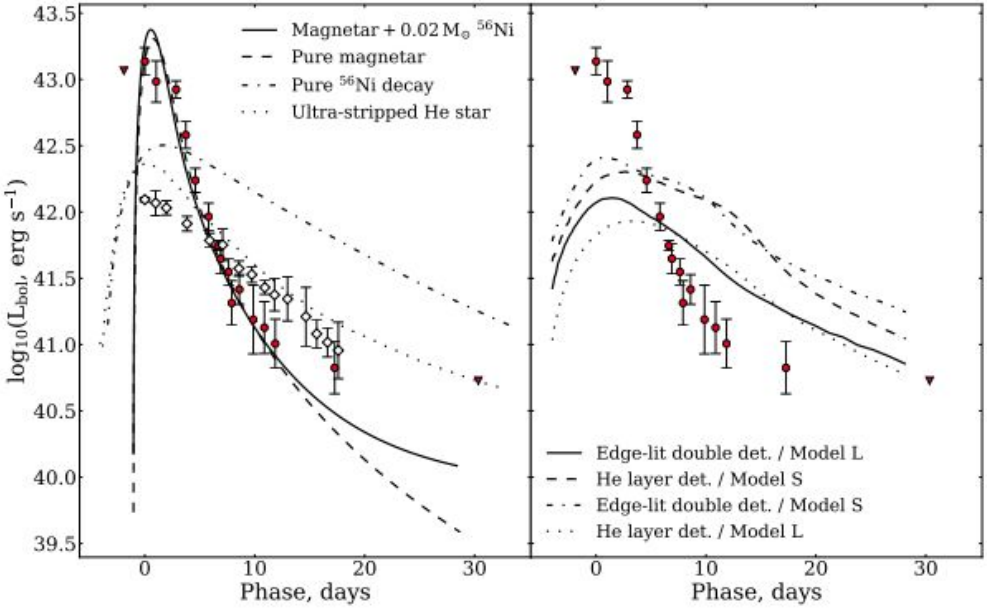




Chen et al. 2019

SN 2018kzr





McBrien et al. 2019

Dear Santa,

I would like that Gaia releases data of all transients, even those one no co-discover by Gaia.

Best regards and Merry Christmas,

Mariusz