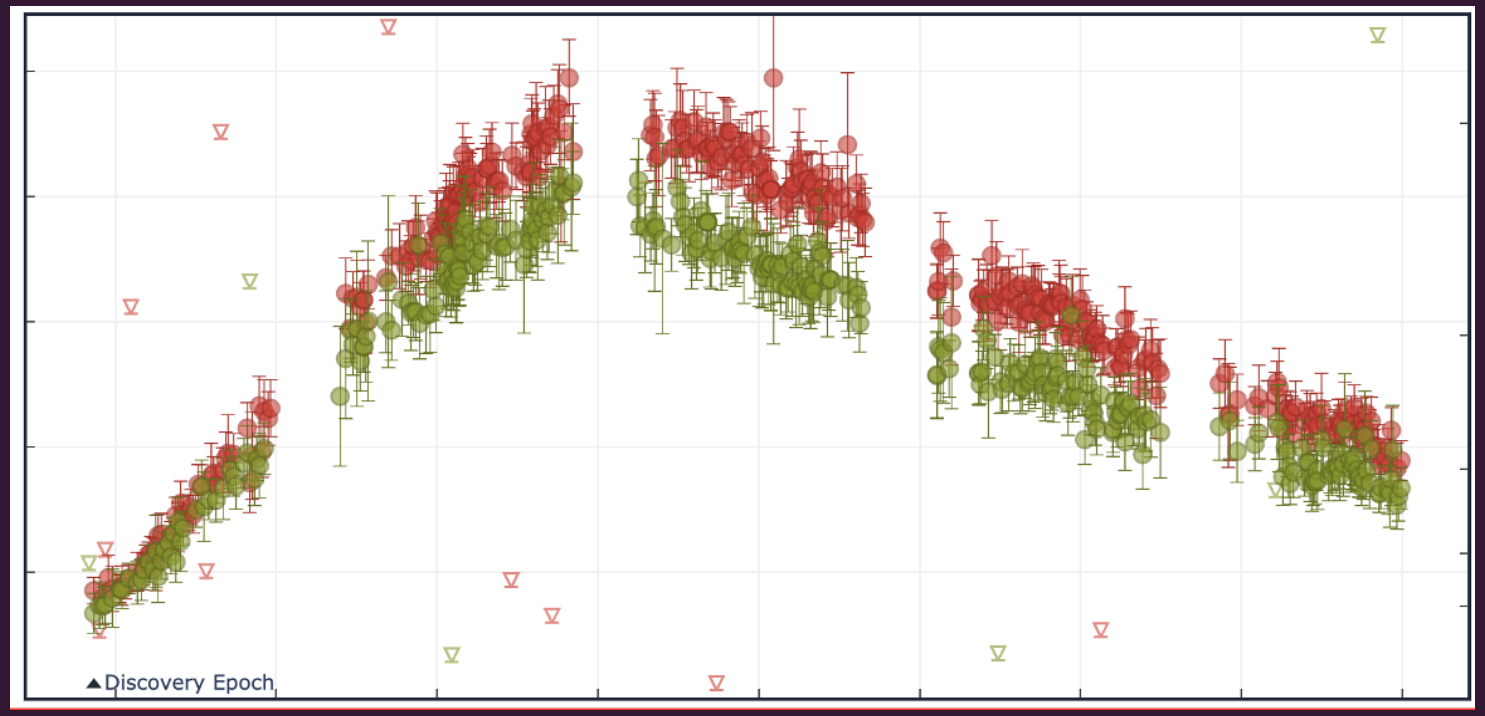
Tidal Disruption Events

Histories and Mysteries

Phil Wiseman (Southampton; he/him/his)



Possible power source of Seyfert galax

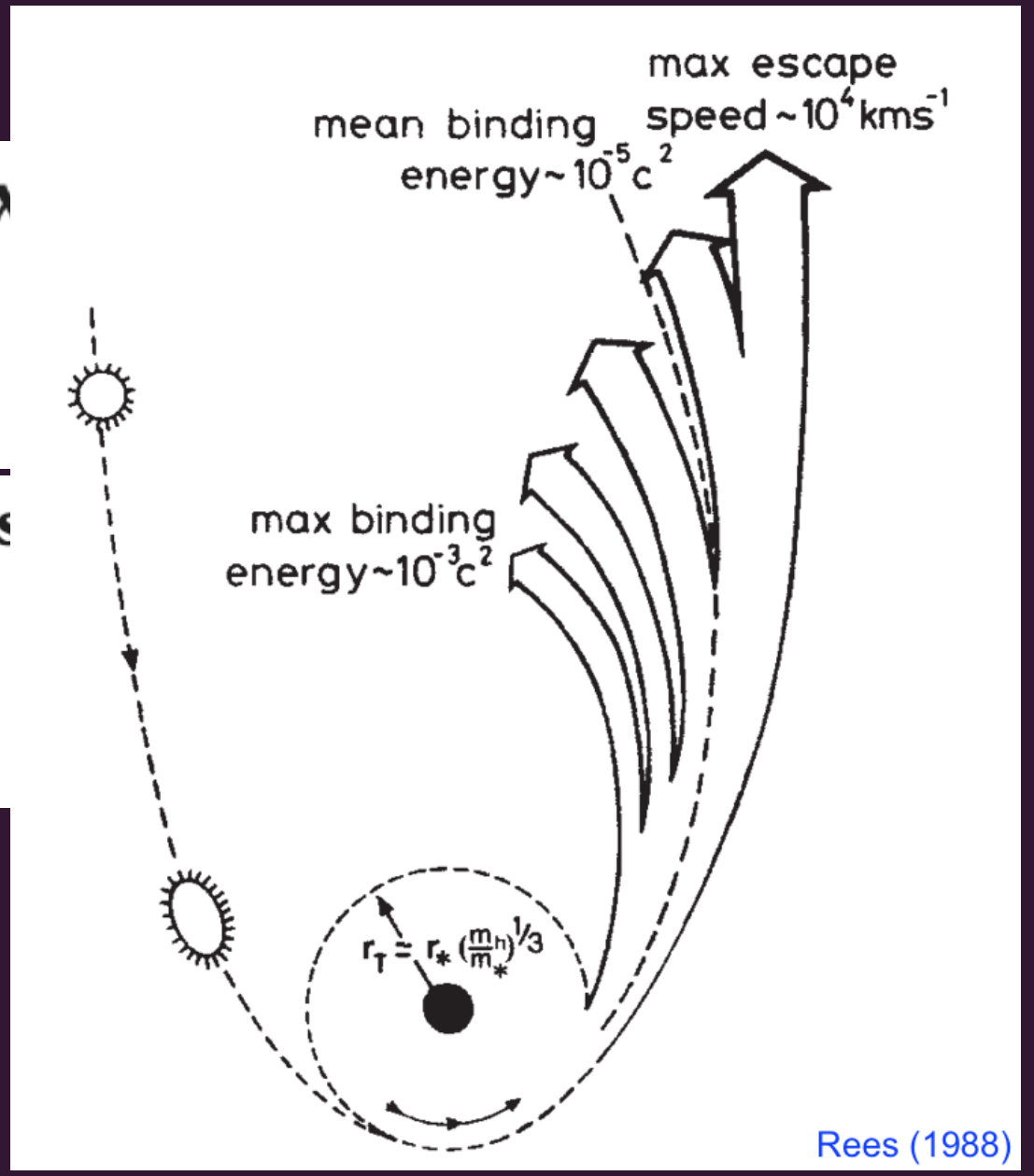
J. G. Hills

Nature **254**, 295–298 (1975) | Cite this article

Tidal disruption of stars by black holes masses in nearby galaxies

Martin J. Rees

Nature **333**, 523–528 (1988) | Cite this article



Rees (1988)

Detection of an extremely soft X-ray outburst in the H II-like nucleus of NGC 5905

Norbert Bade[1], Stefanie Komossa[2], and Michael Dahlem[3,⋆]

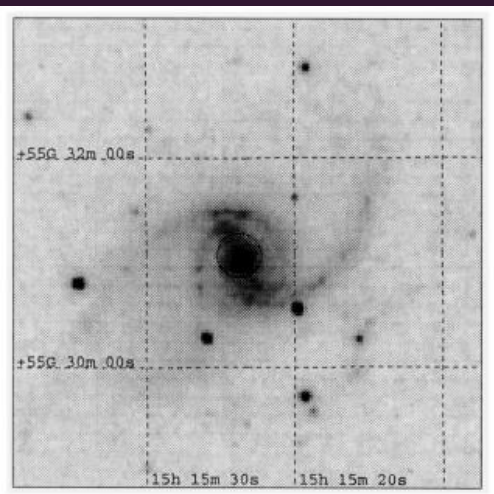


Fig. 1. Digitized POSS image of NGC 5905 with RASS error circle.

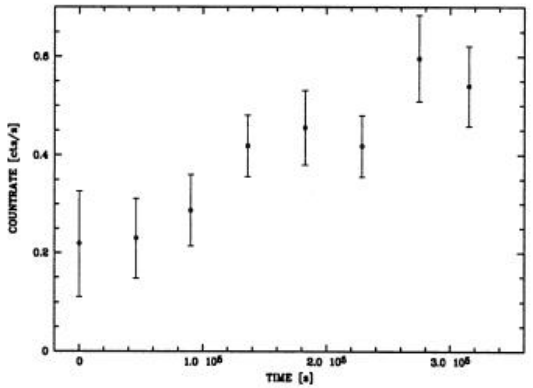
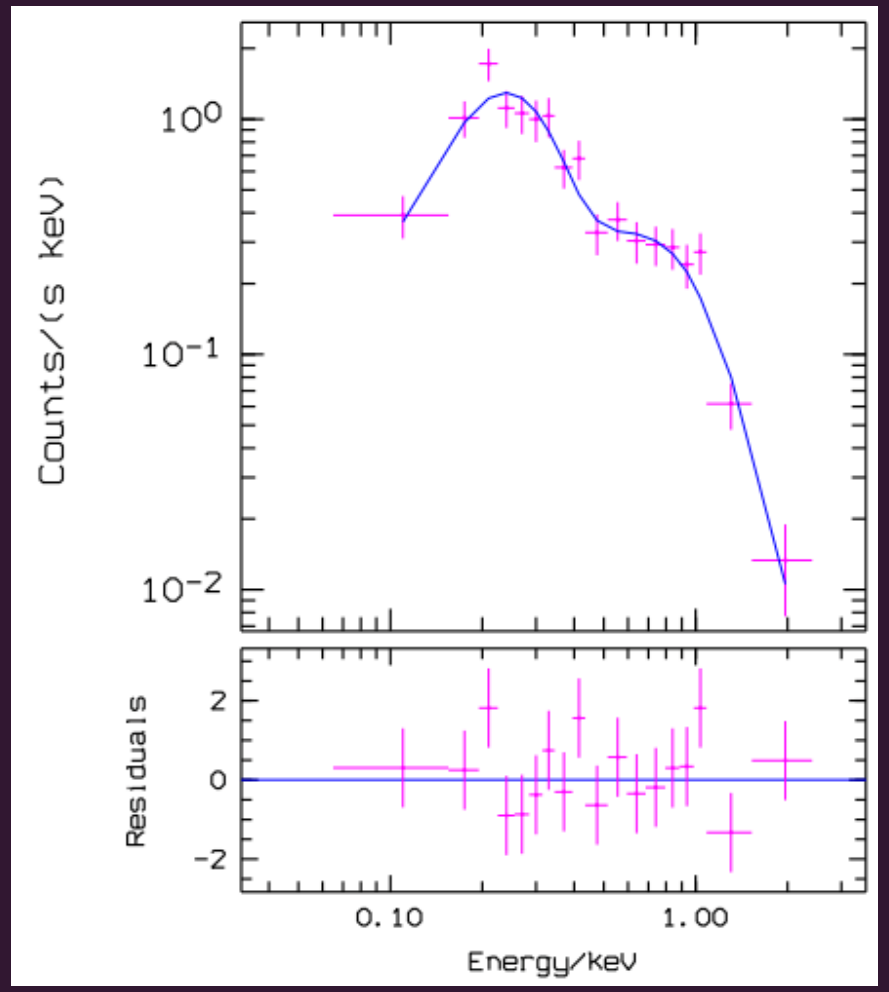


Fig. 2. X-ray light curve of NGC 5905 in the RASS test phase (July 12-15, 1990)

Bade, Komossa, Dahlem, 96

RX J1624.9+7554: A new X-ray transient AGN

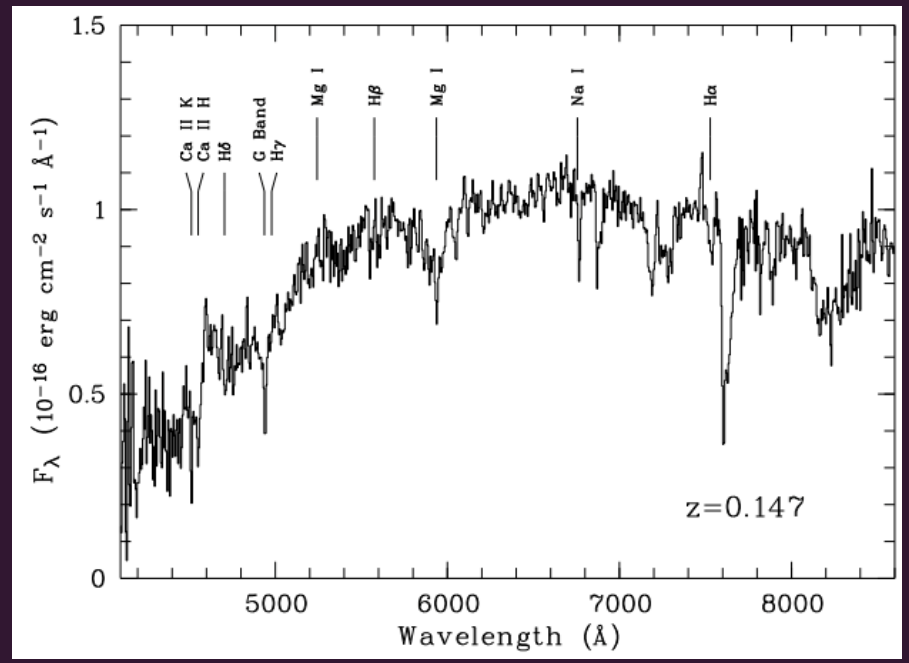
D. Grupe[1,⋆], H.-C. Thomas[2], and K.M. Leighly[3]



Grupe, Thomas, Leighly, 99

RX J1420.4+5334 – another tidal disruption event?

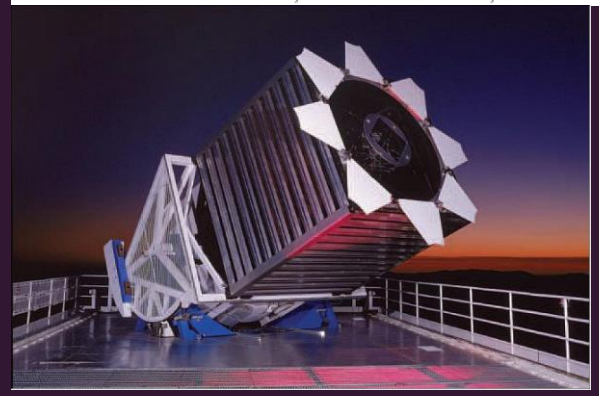
J. Greiner[1], R. Schwarz[1], S. Zharikov[2,3], M. Orio[4,5]

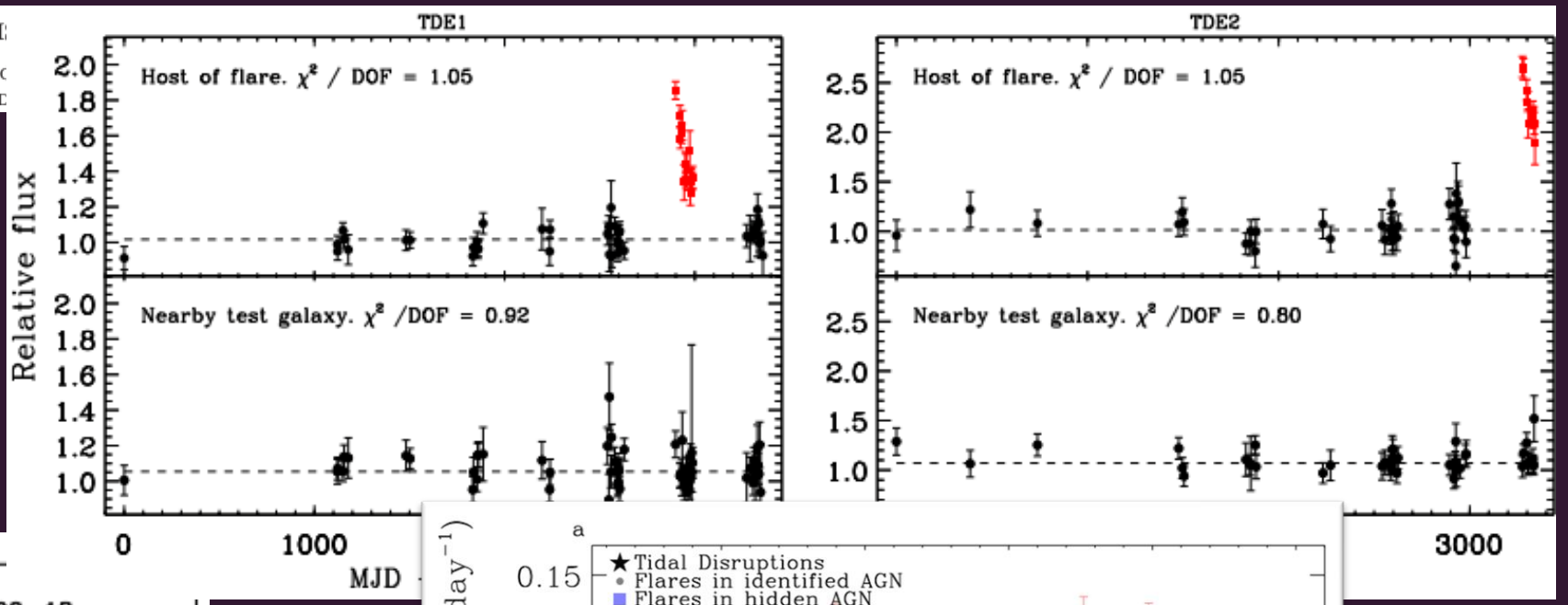


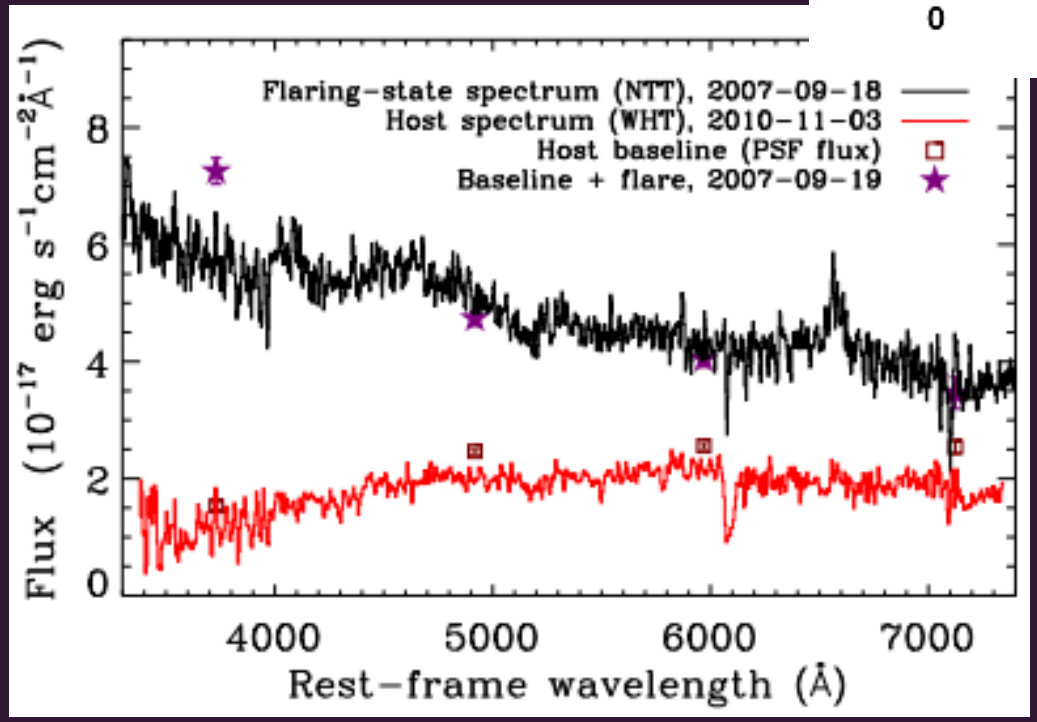
Greiner+00

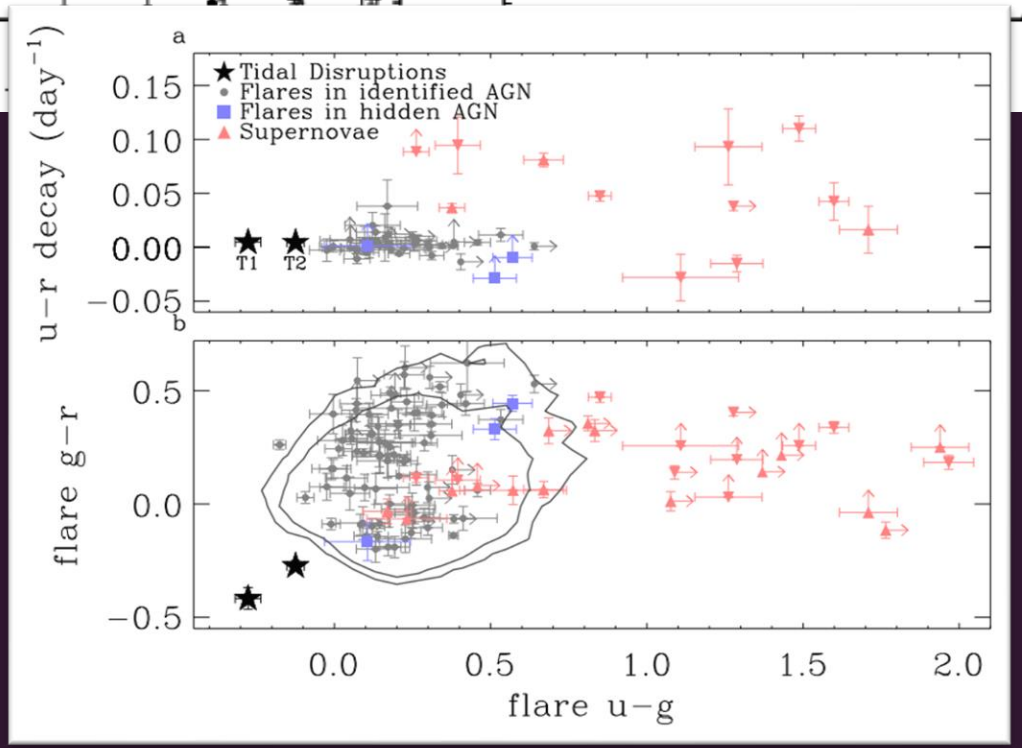
OPTICAL DISCOVERY OF PROBABLE STELLAR TIDAL DI

Sjoert van Velzen[1,2,3], Glennys R. Farrar[1,4], Suvi Gezari[5], Nidia Mo
Linda Östman[8], Mathew Smith[9], Joseph Gelfand[10] and And

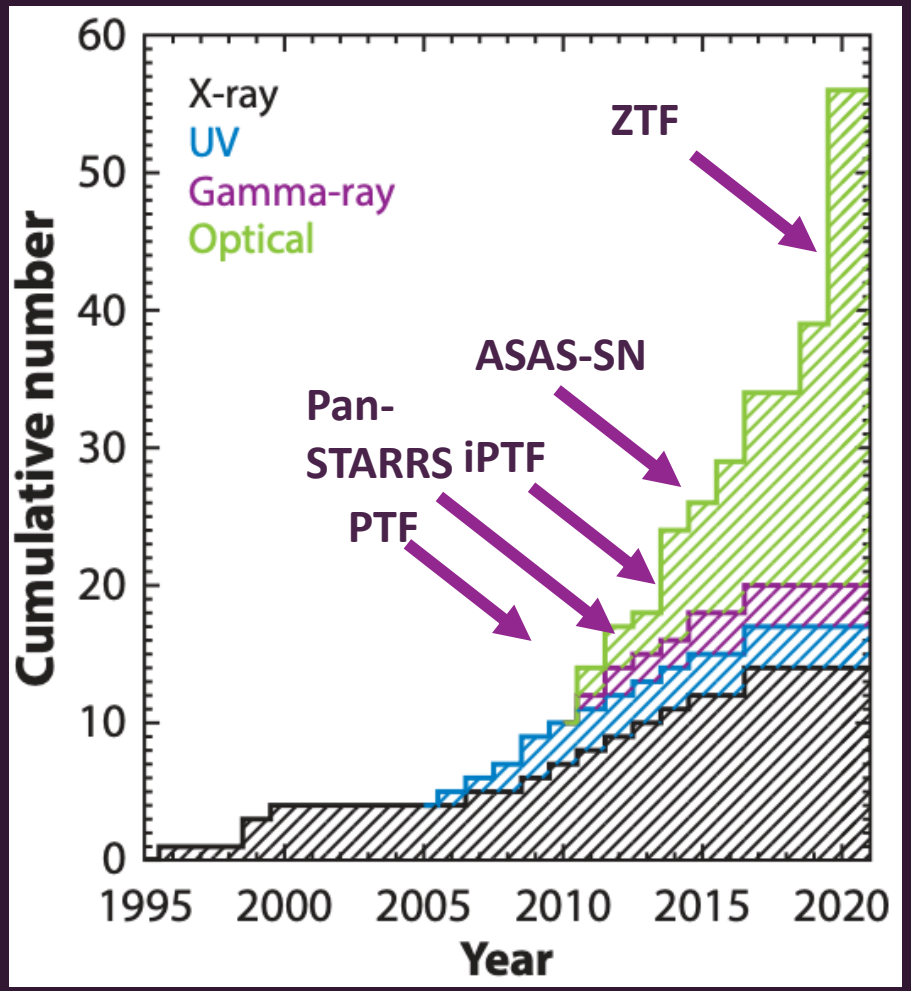


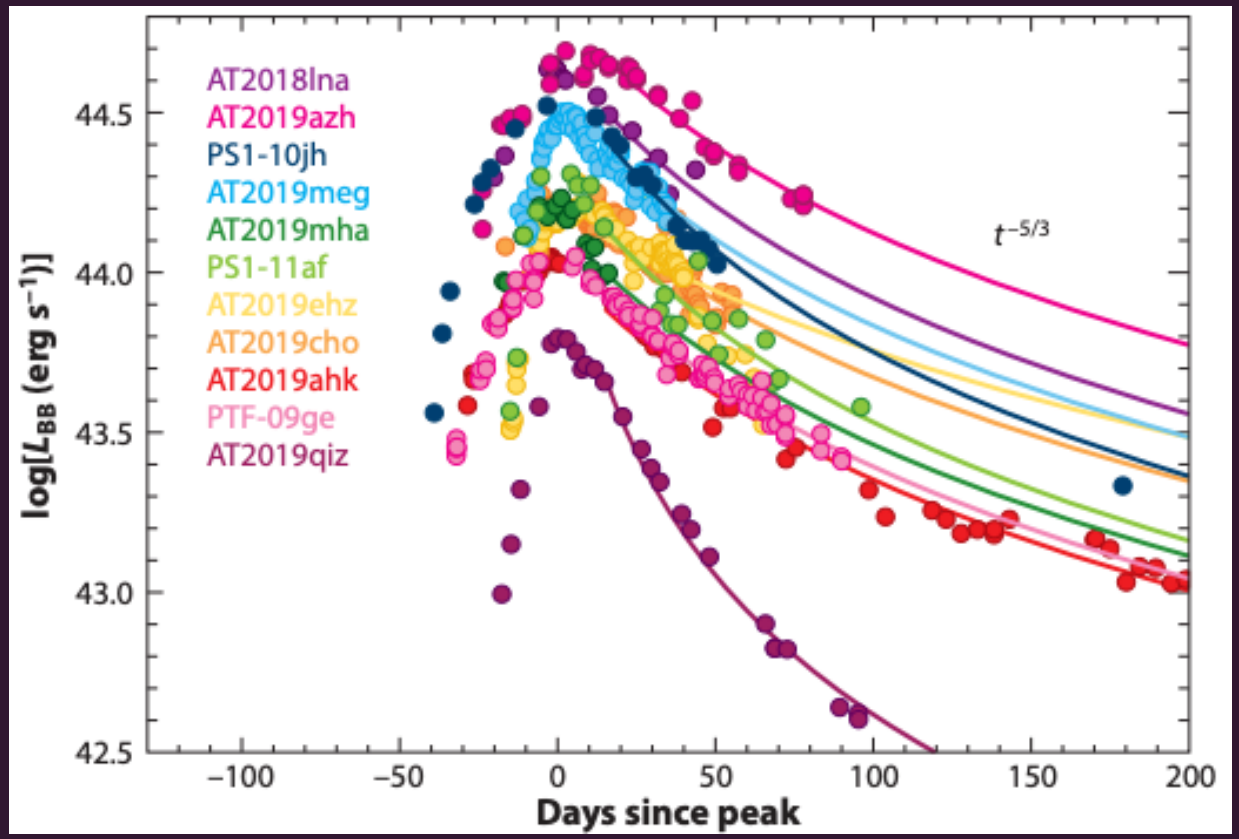






Discovery rate of TDEs

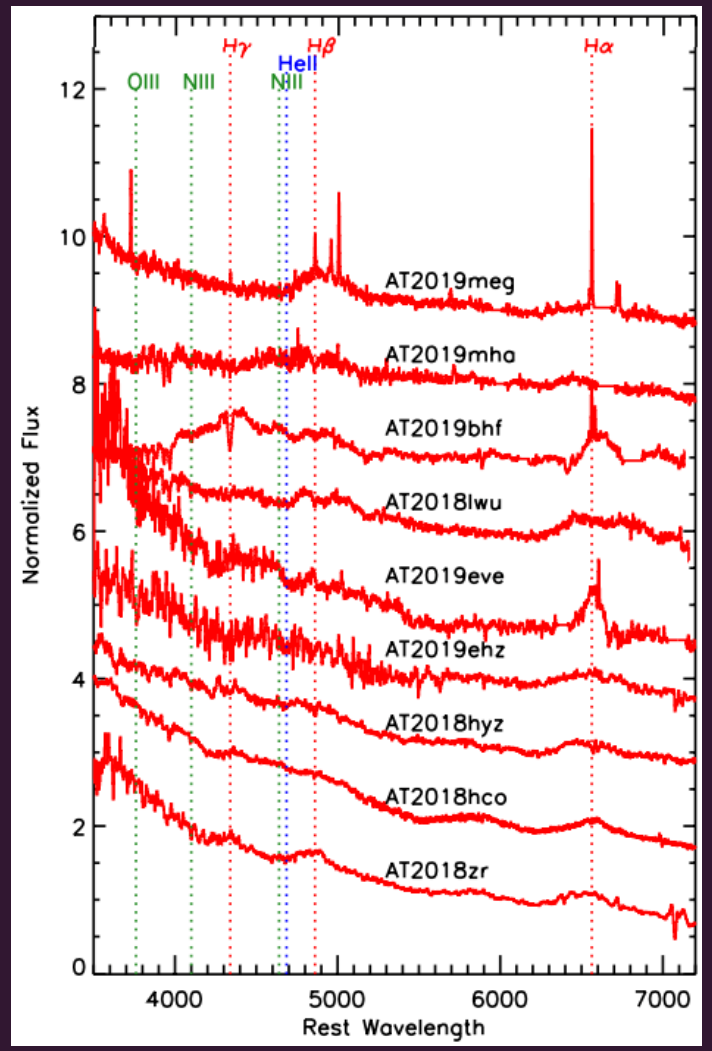




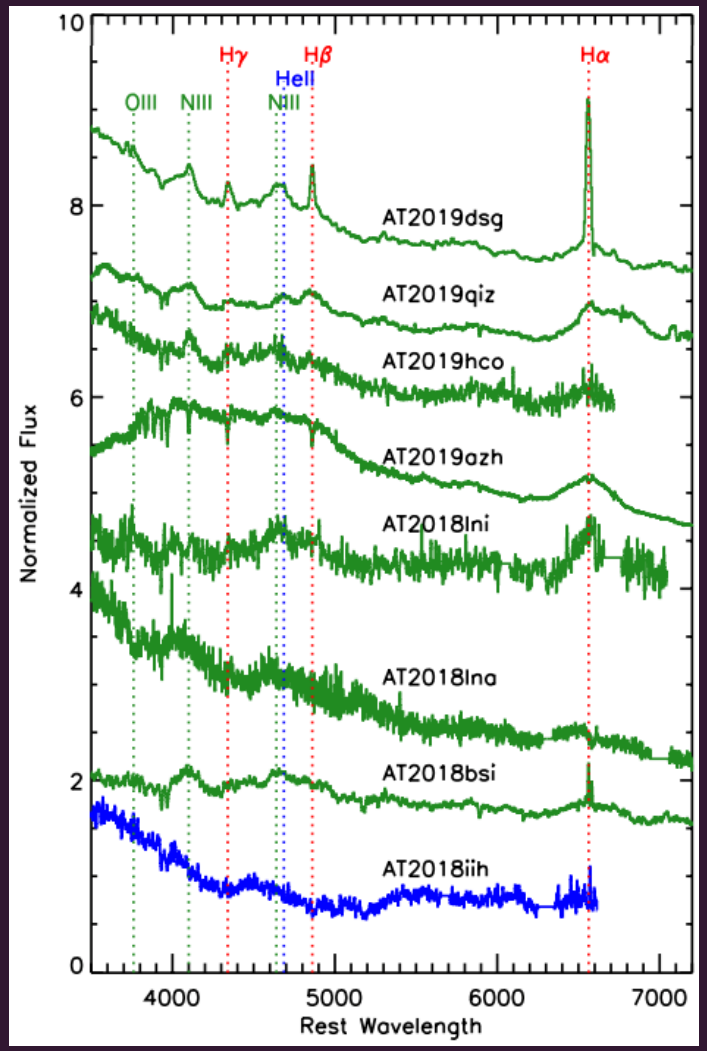
Gezari (2021)

Optical Spectra

TDE-H



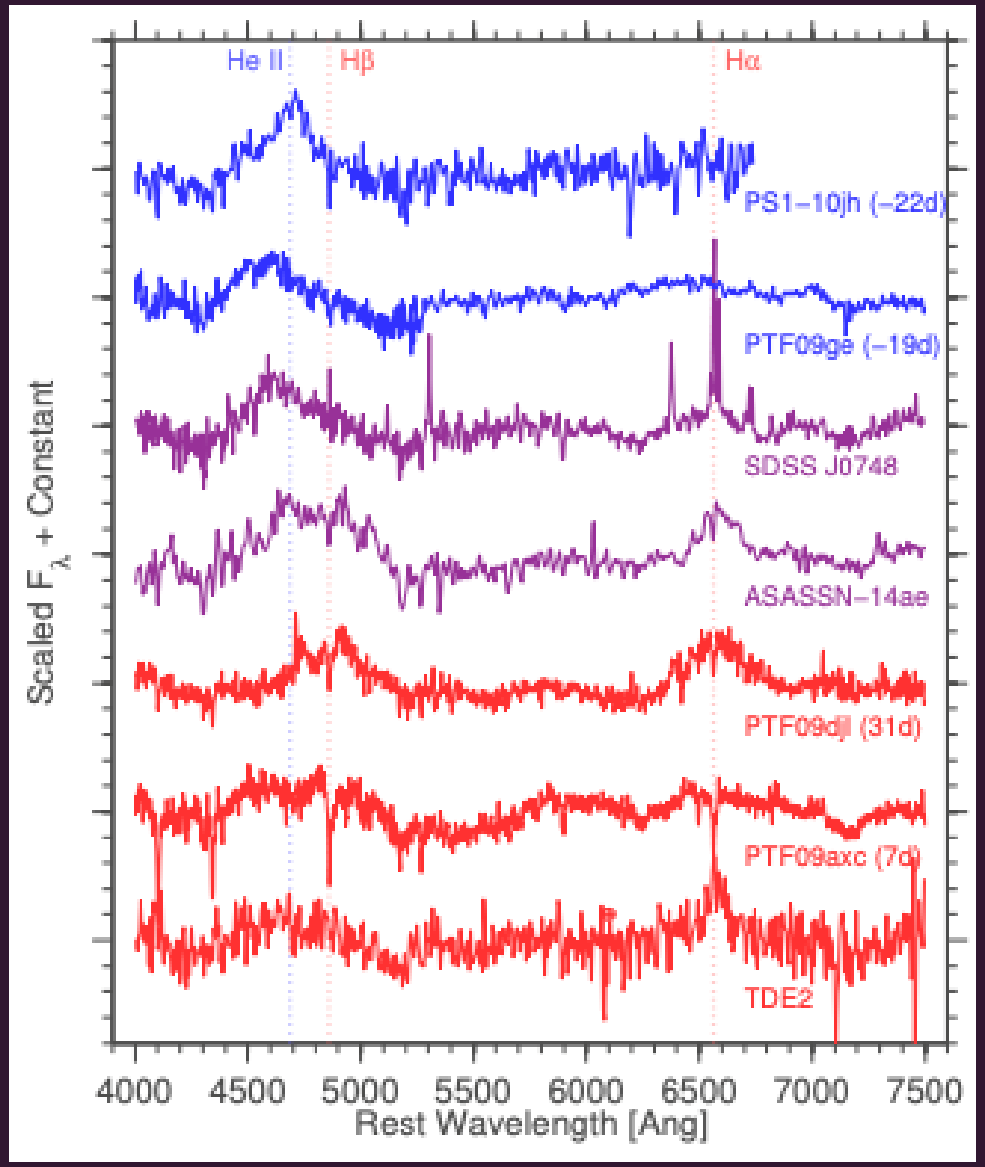
TDE-H+He



Van Velzen+21

He-Rich

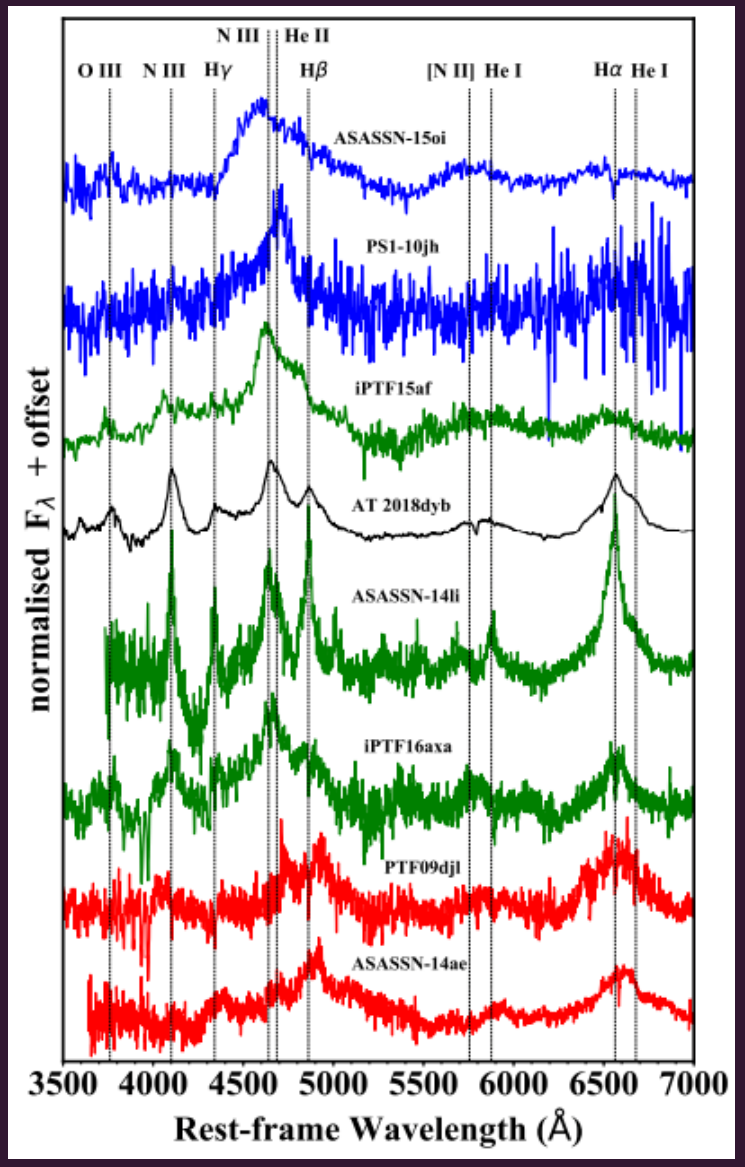
H-Rich



Arcavi+14

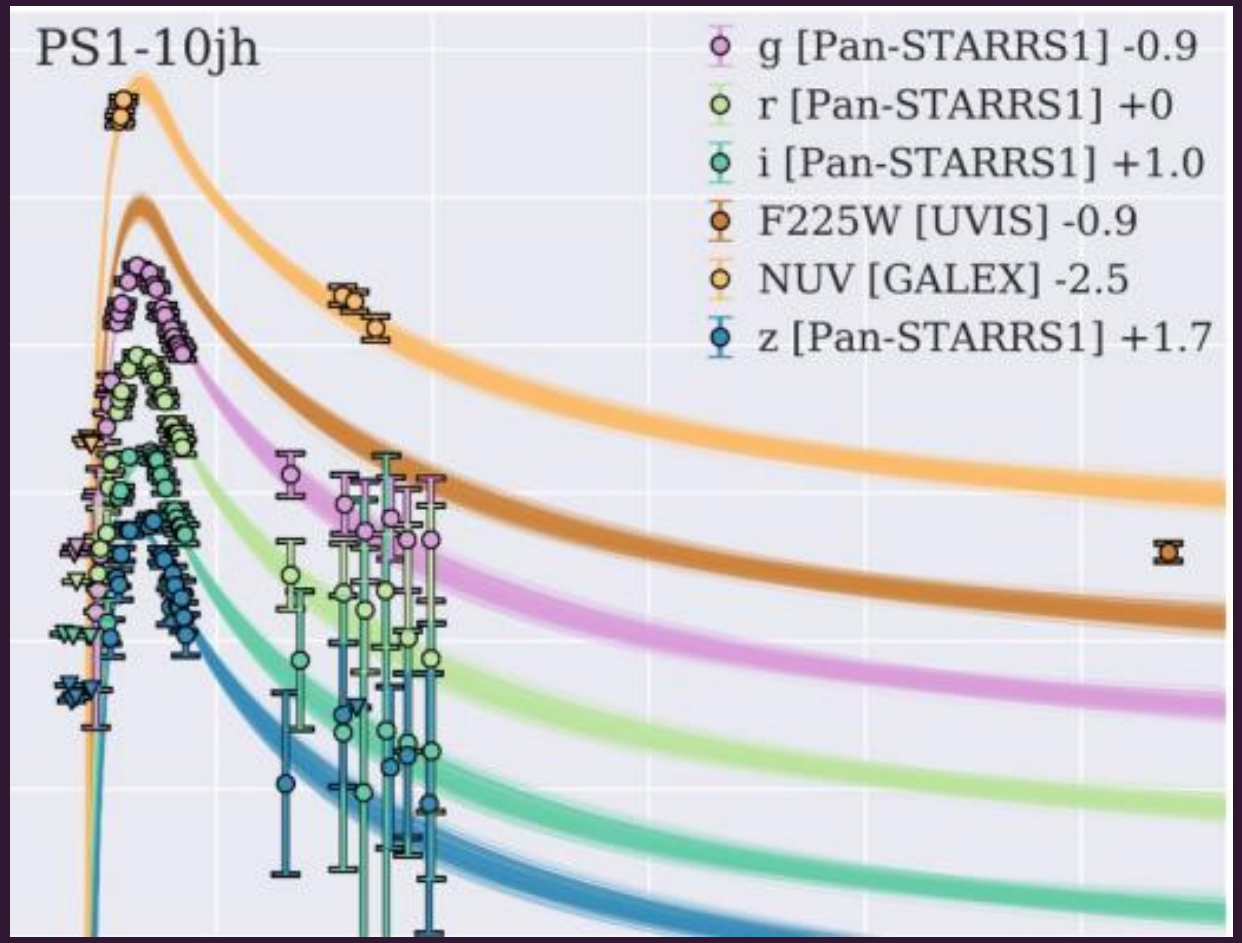
He-Rich

H-Rich

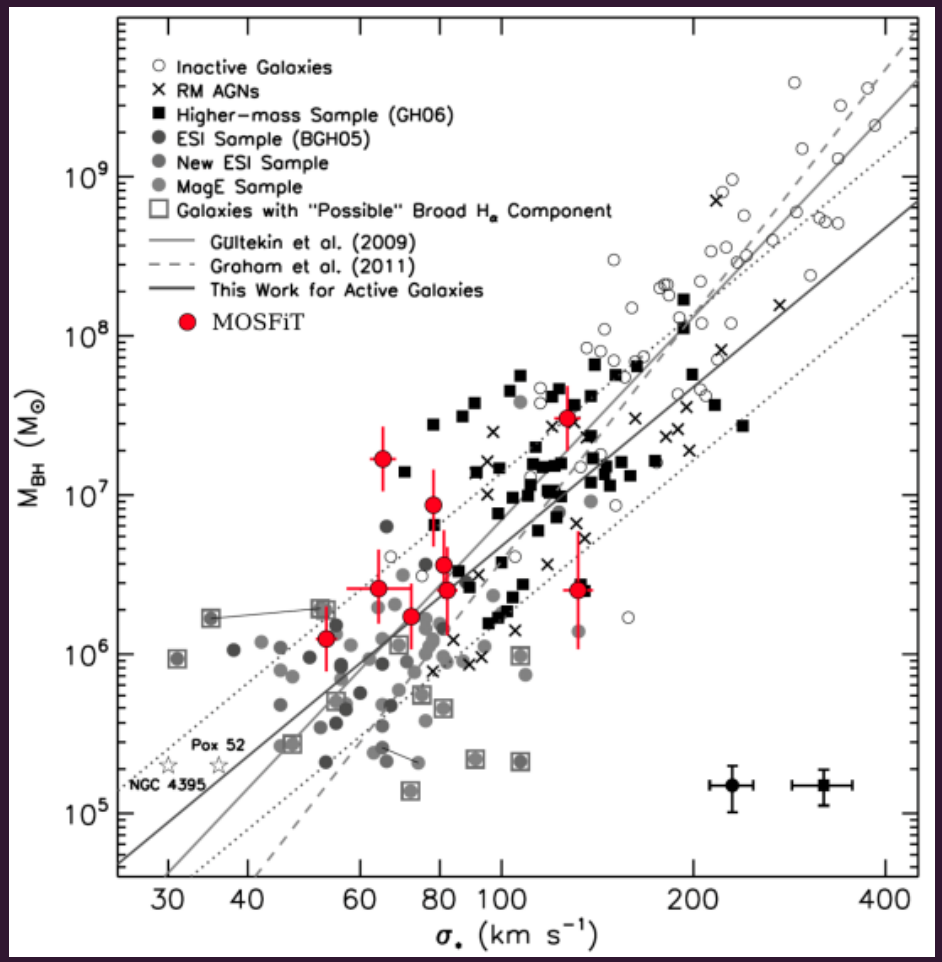


Leloudas+19

Black hole masses



Mockler+19



Lasair

ZTF20abrbeie
318.451732, 27.430660

Discovery Date: 2020-07-16 10:18:31 UTC
Discovery MJD: 59046.43
Disc r-Mag: 20.77±0.25

Latest Date: 2023-06-09 09:11:47 UTC
Latest MJD: 60104.38
Latest r-Mag: 19.64±0.18

Transient Name Server
AT2021lwx

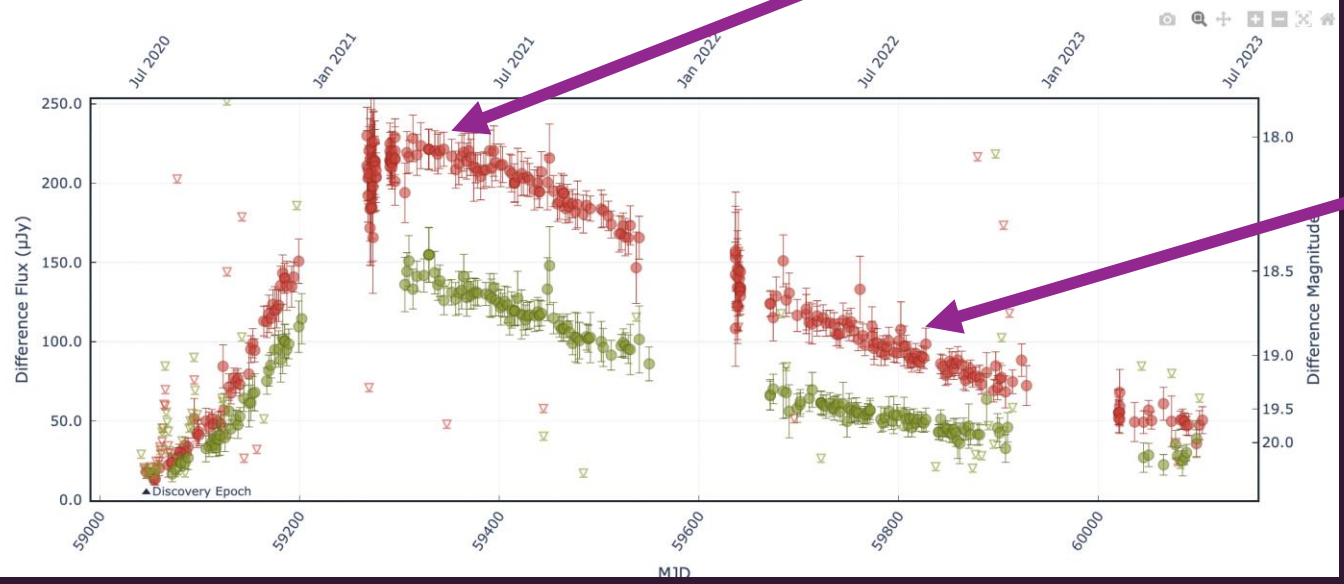
The transient was discovered on ***13th April 2021 at 10:55:51*** (MJD 59317.46) by ZTF as ZTF20abrbeie with a discovery magnitude of ***r = 18.05***. It was subsequently classified as a ***AGN*** at ***z = 0.995***.

Sherlock Contextual Classification
Prediction: **ORPHAN**

The transient is not obviously associated with any catalogued galaxy nor is it coincident with a known stellar source.

Difference Image Lightcurve

Access the data from this plot in the *ZTF Alert Packet Data* table below.



Pessto ESO

"Now we just mention that AT2021lwx shows a blue continuum with no clearly identifiable line features"

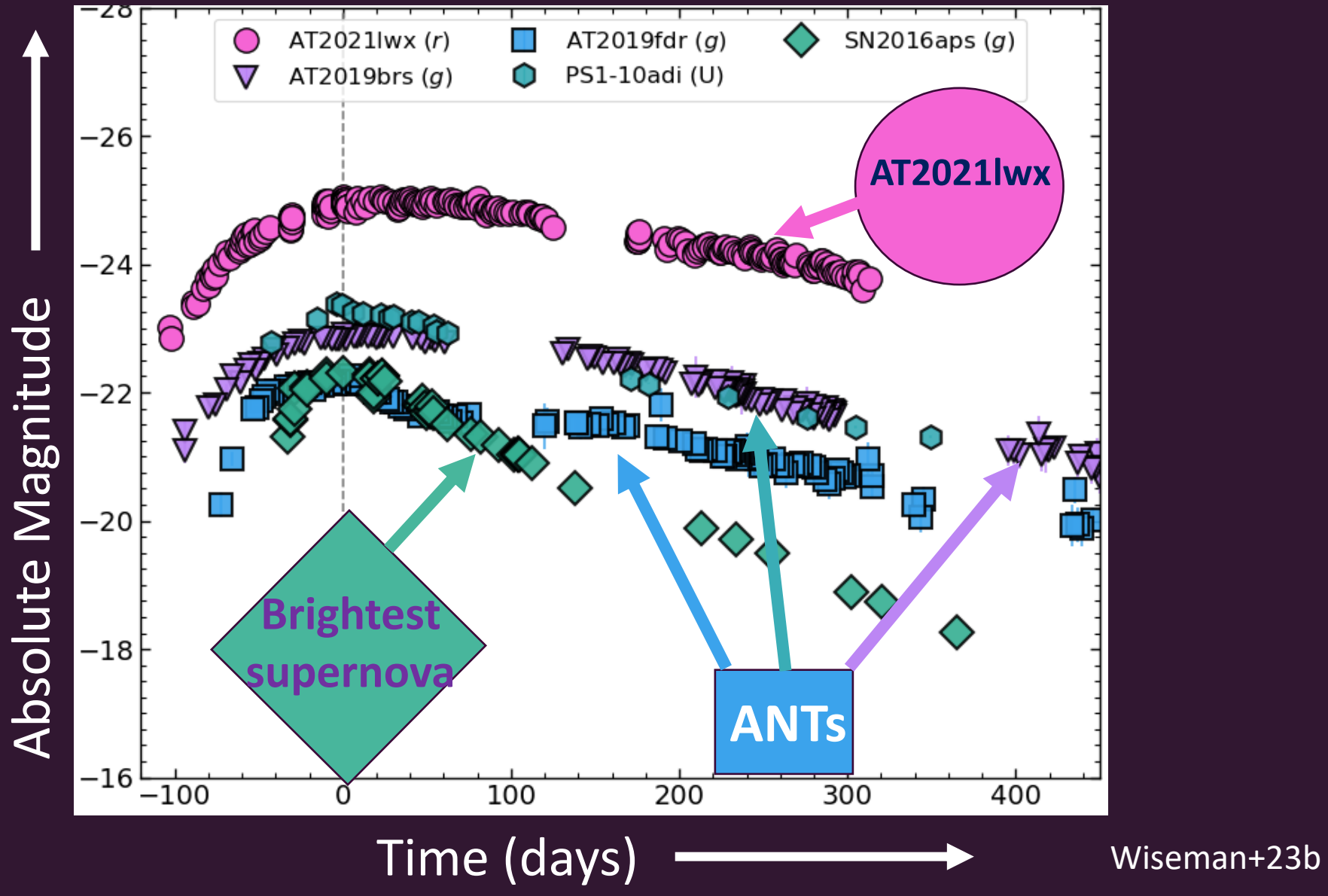
"Wait, there are absorption lines at z=1. That makes it about -26 mag!"

ZTF20abrbeie = AT2021lwx

CIII] CII] MgII H-beta H-alpha

Wiseman+23b

ZTF20abrbeie = AT2021lwx



Wiseman+23b

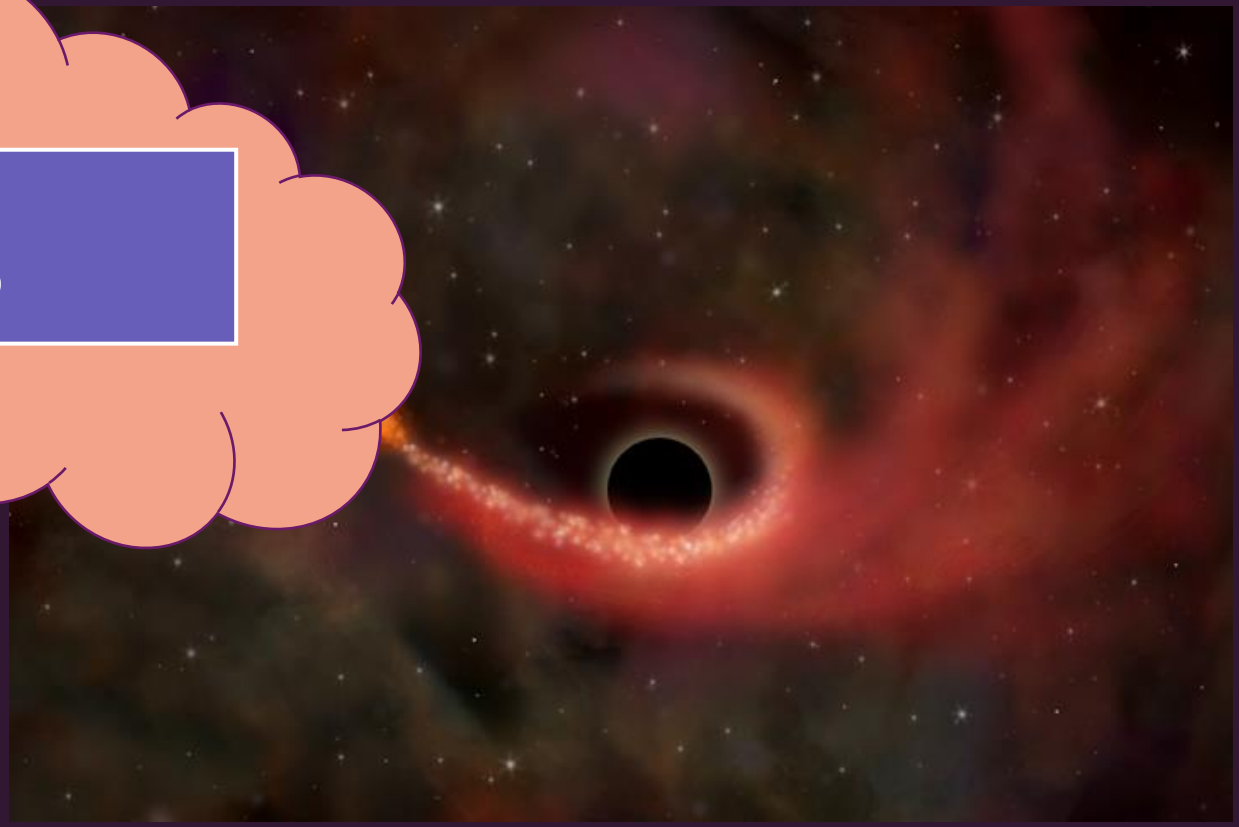
AT2021lwx

The largest ever **for now…**

Supernova would need a star 500 times m
massive than the Sun!

↓

And a 500 solar mass circumstellar medium



Tidal disruption of a star?

↓

Star like the Sun would fall straight in!

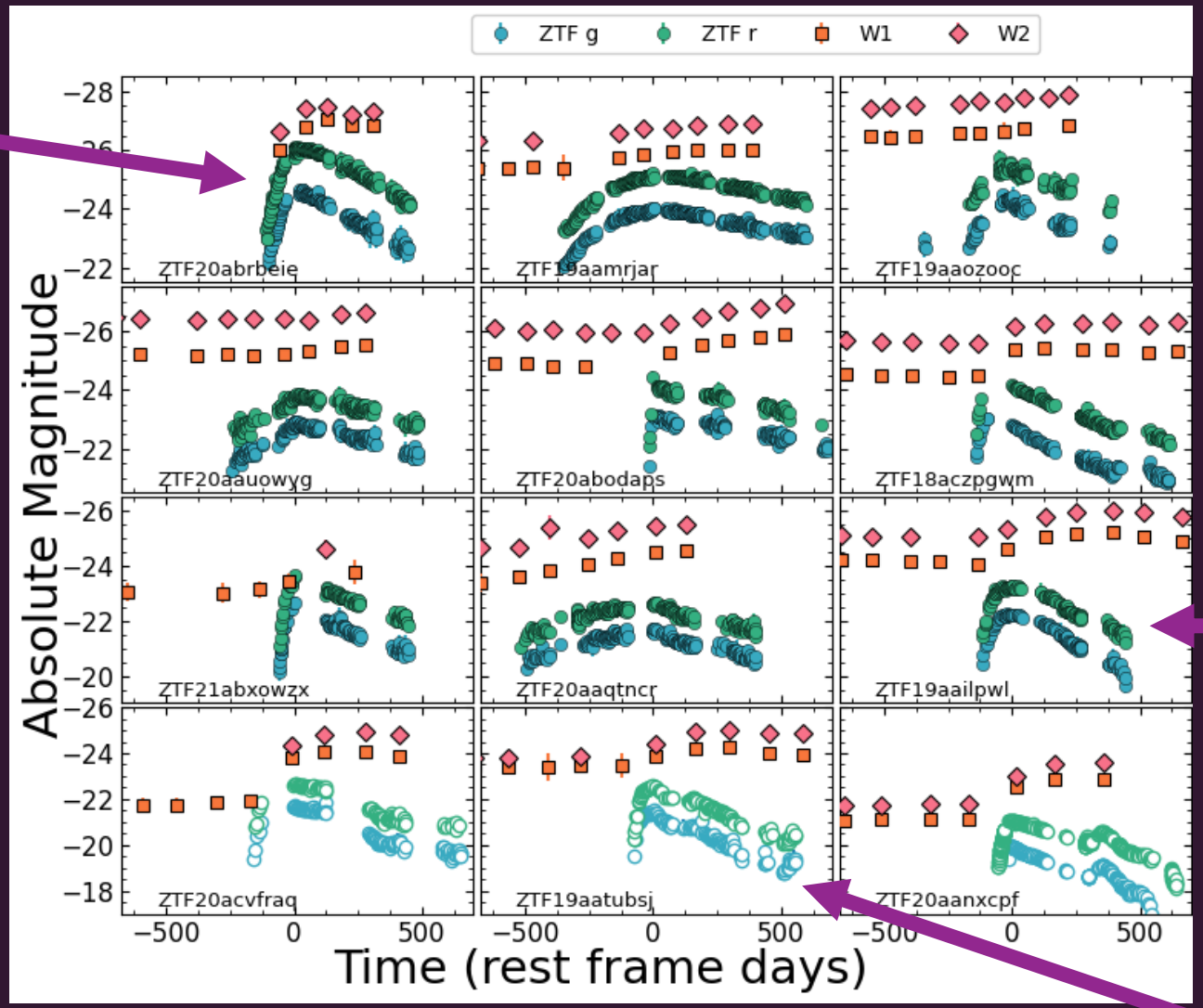
↓

15 solar mass star gives us the energy we need (see Subrayan et al. 2023, ApJ, 948, 19)

Disruption/accretion of large gas cloud (GMC?)

ZTF Search – Some Preliminary Results

AT2021lwx

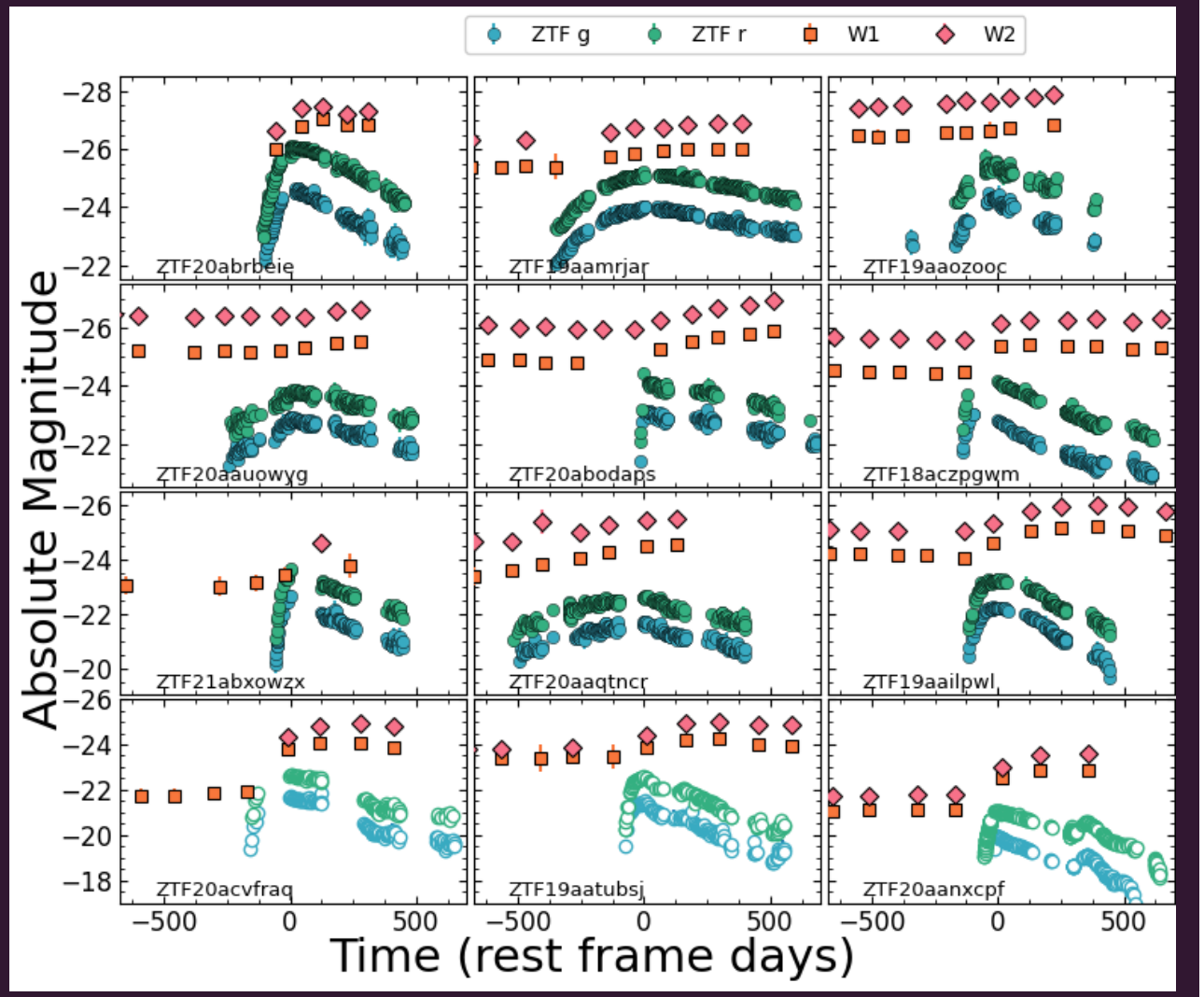


AT2019brs

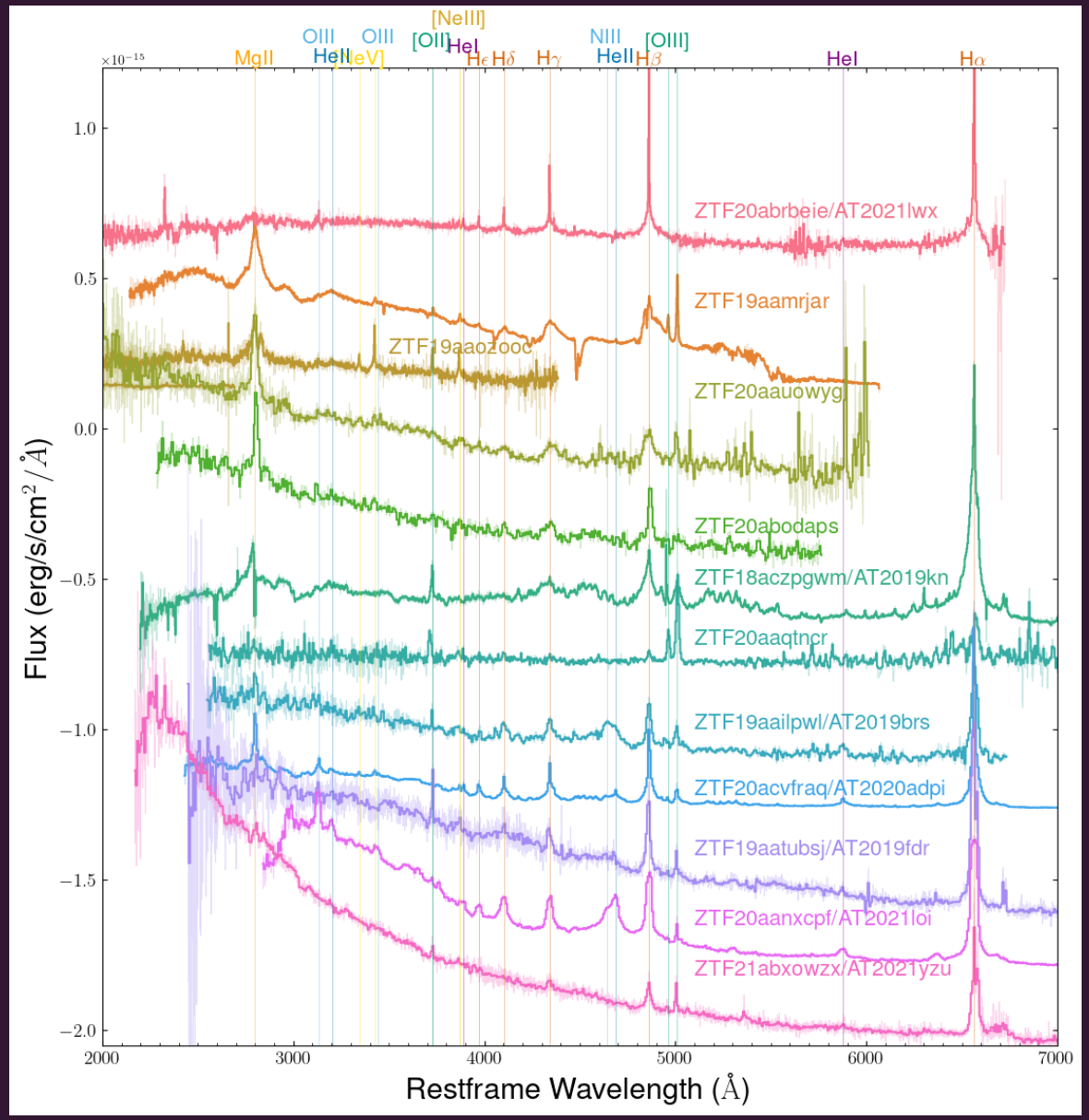
AT2019fdr

Wiseman+ *in prep*

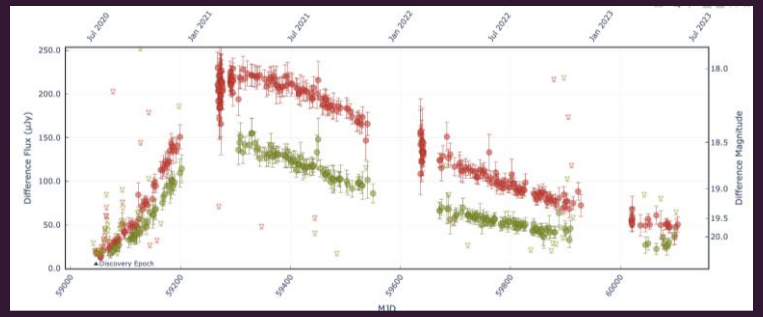
Time (days)



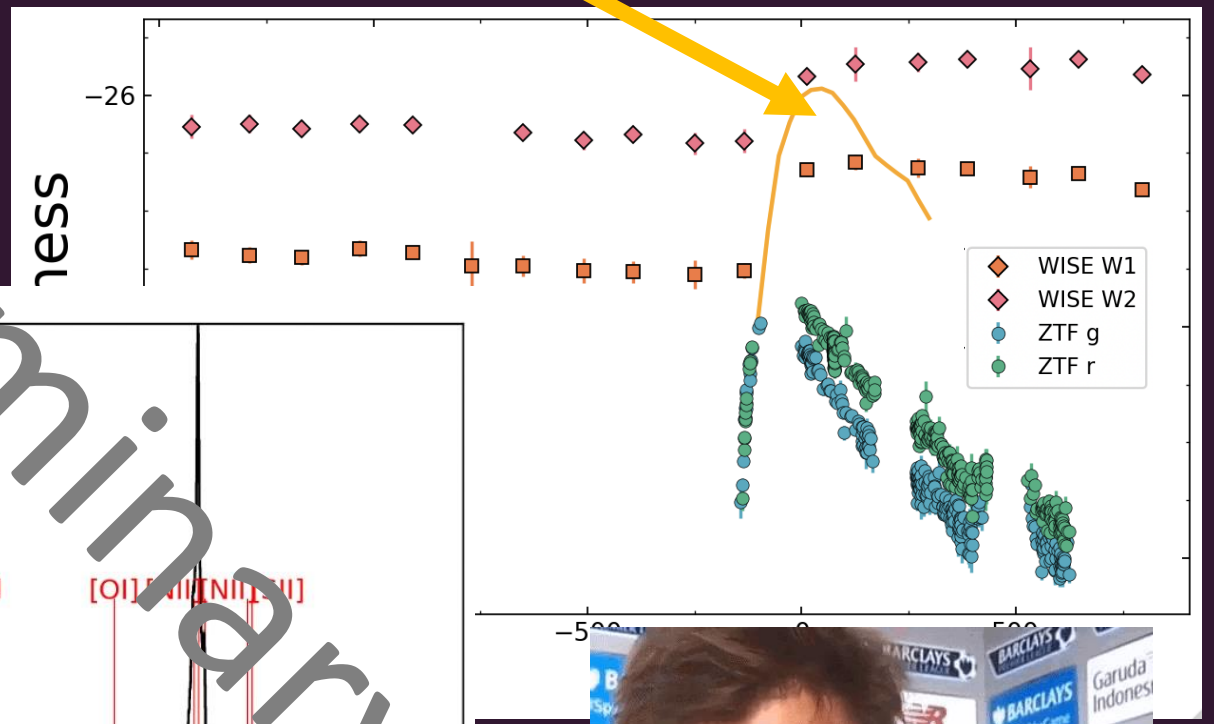
Wiseman+ *in prep*

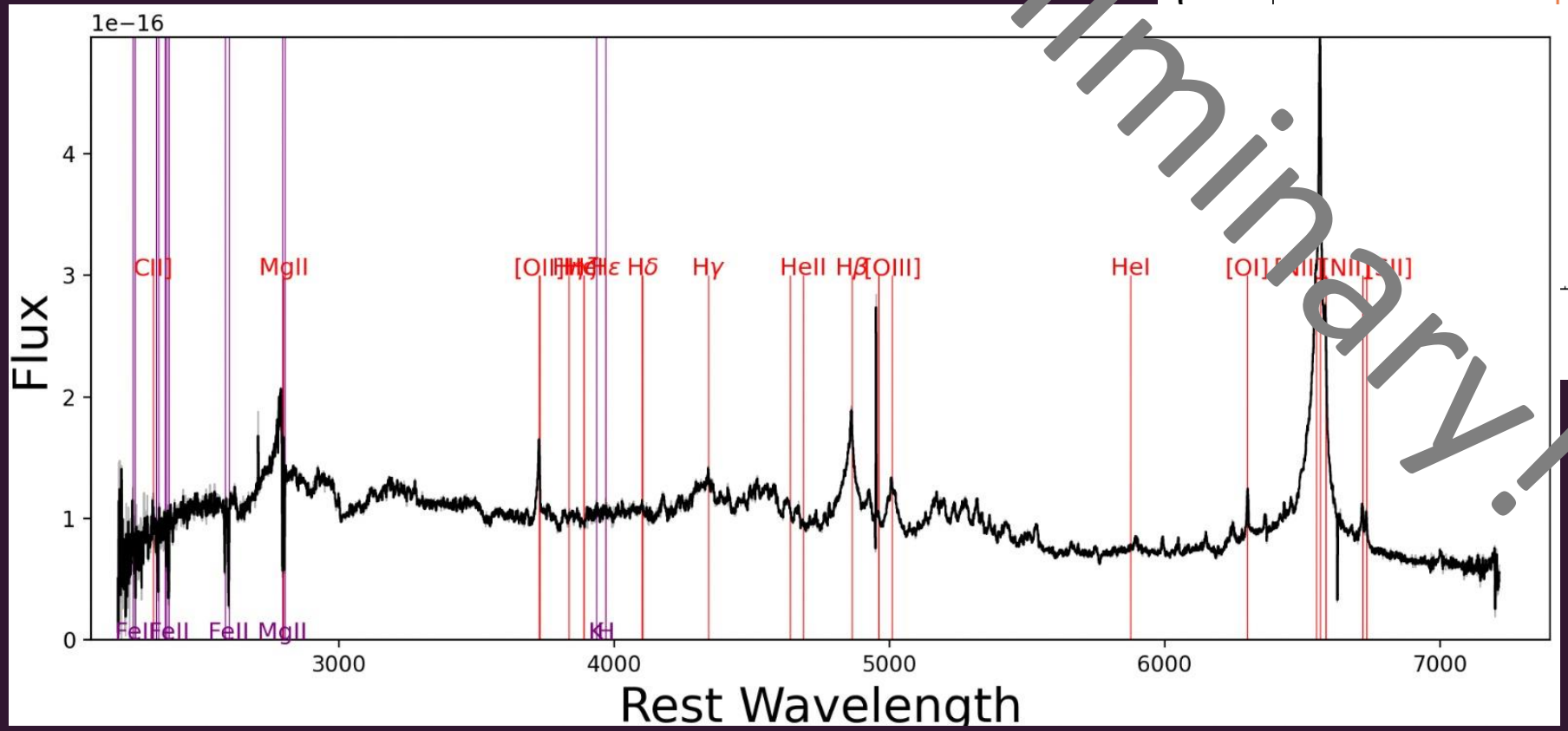


ZTF Search – Some Preliminary Results



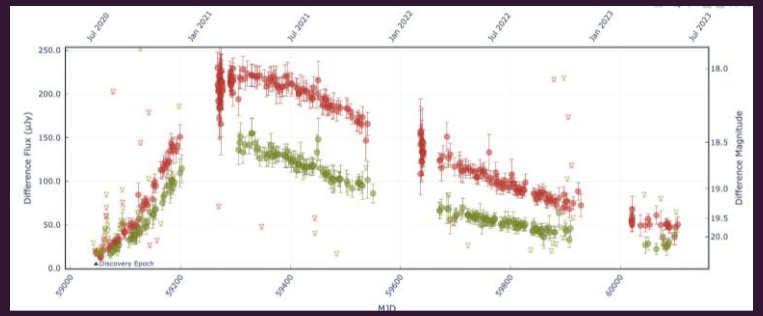
AT2021lwx



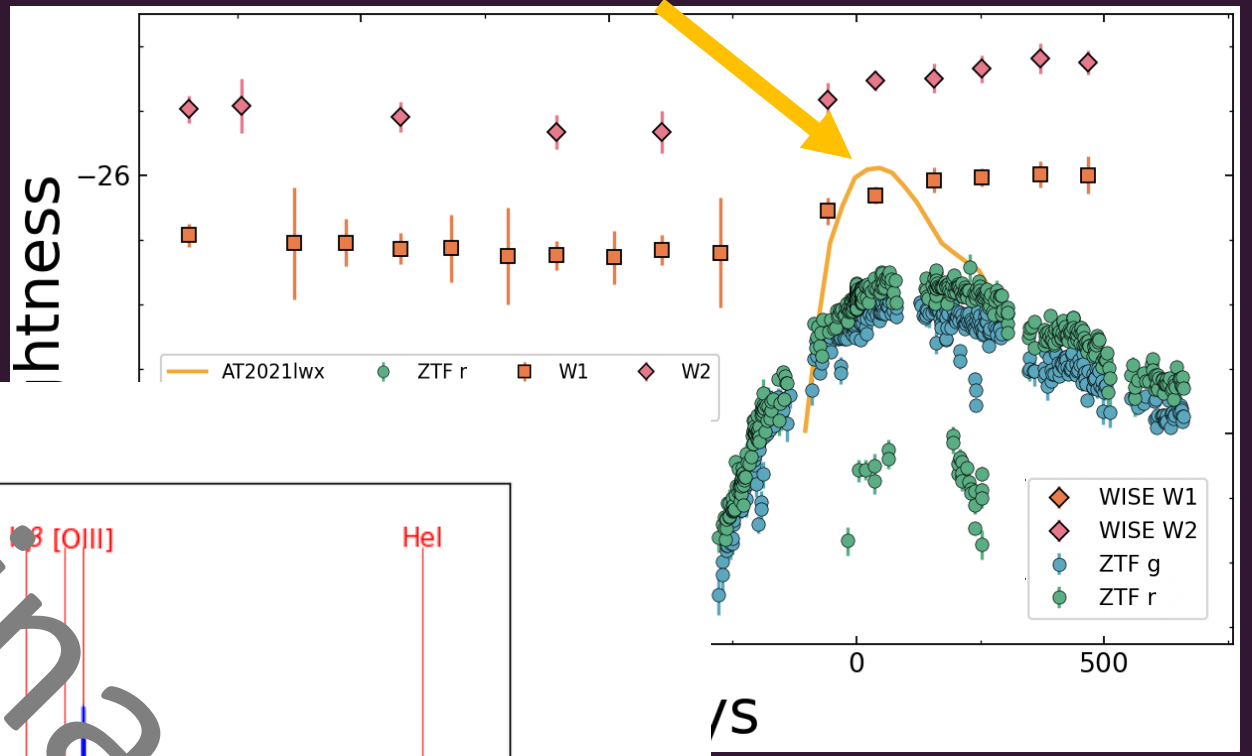


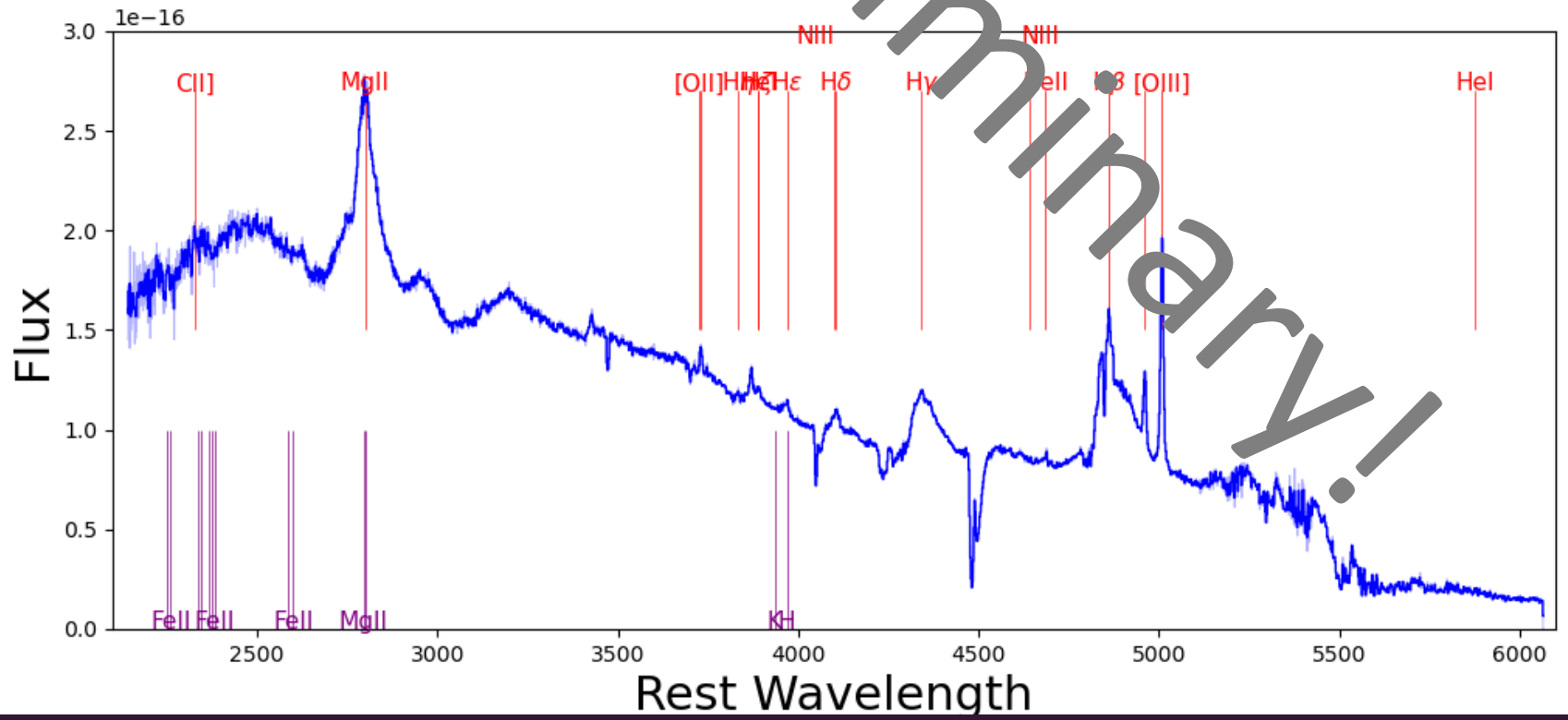
Preliminary!

ZTF Search – Some Preliminary Results



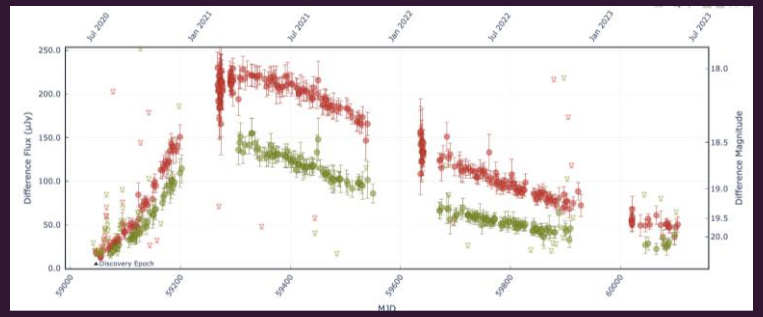
AT2021lwx

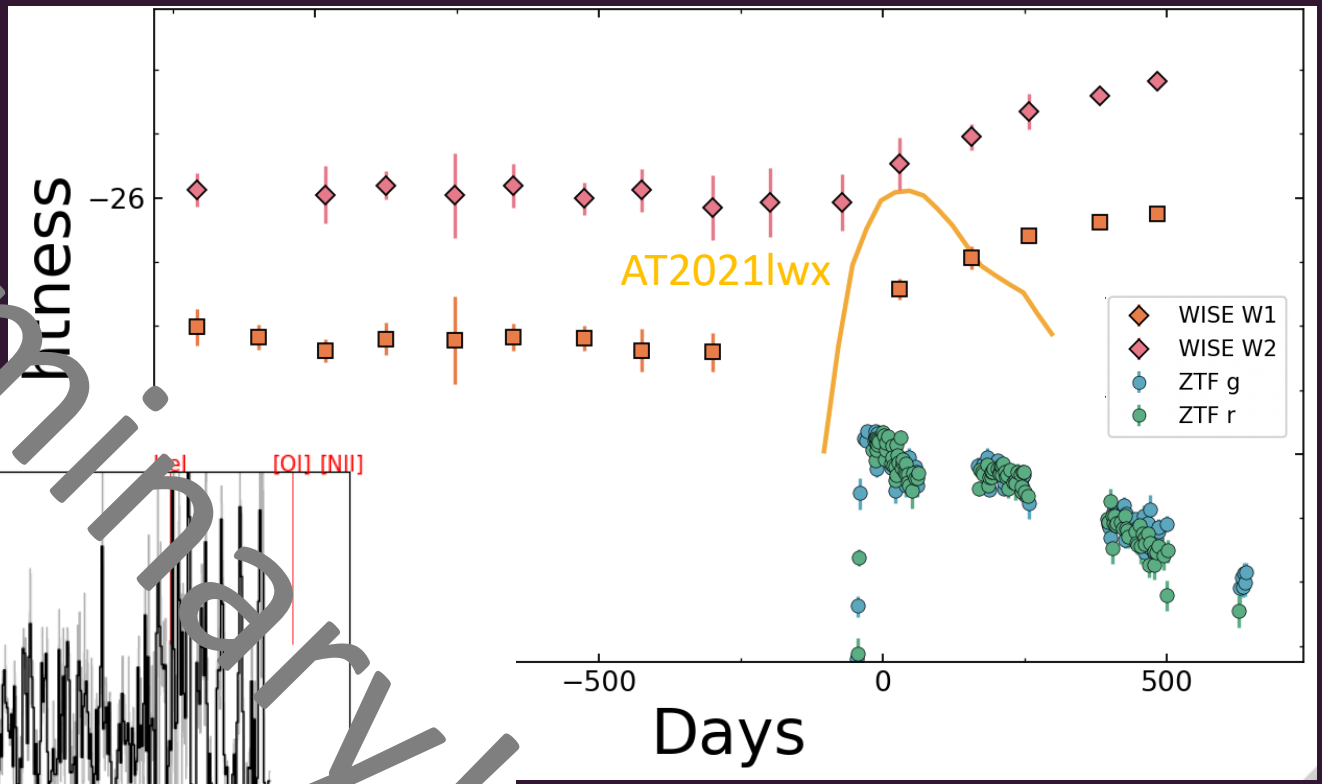


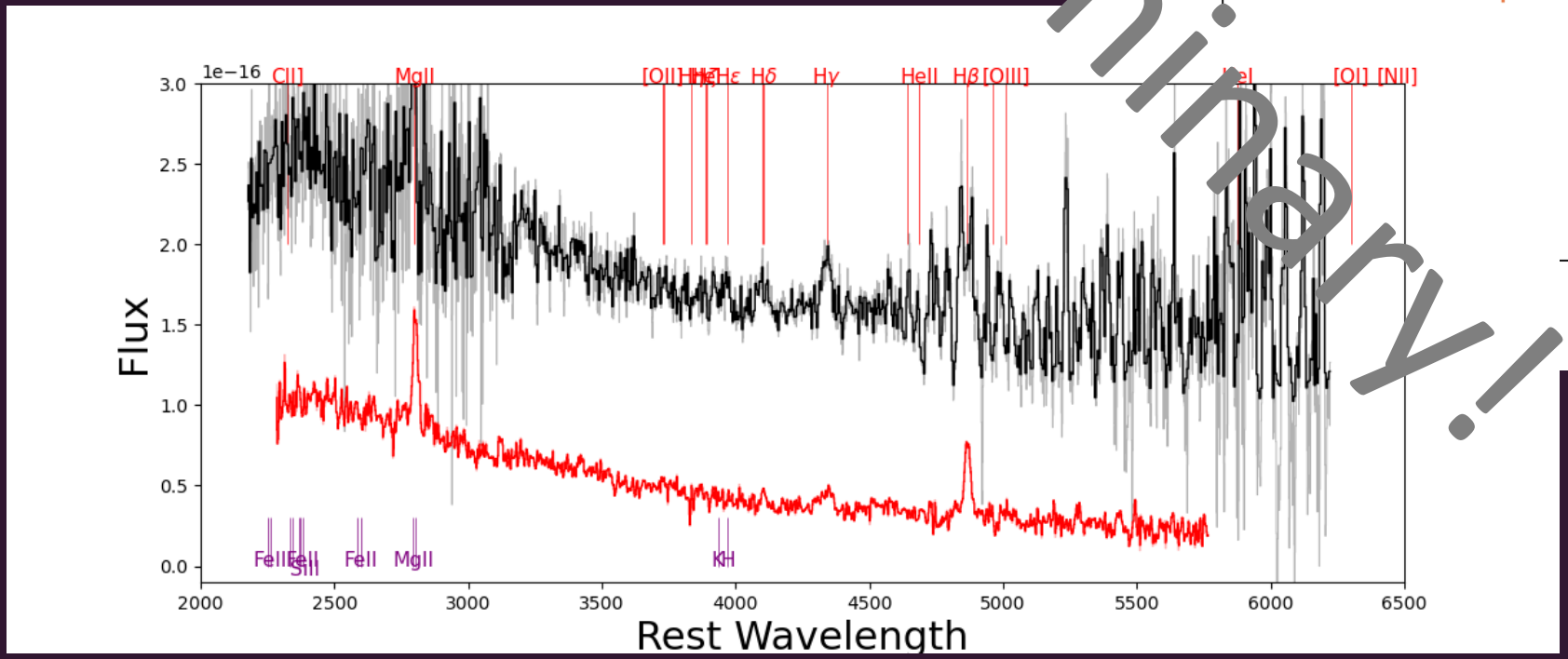


Preliminary!

ZTF Search – Some Preliminary Results







Preliminary!