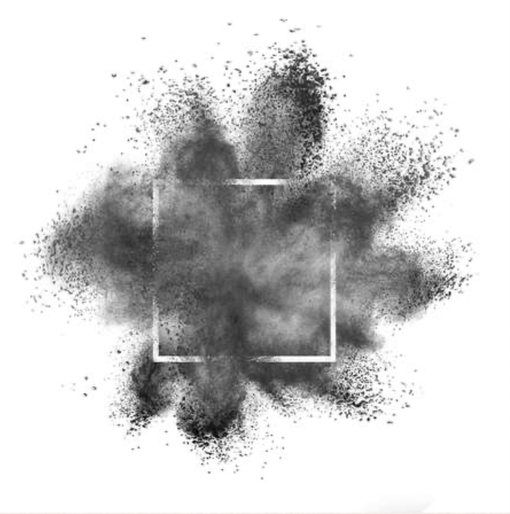


Tools and Techniques:

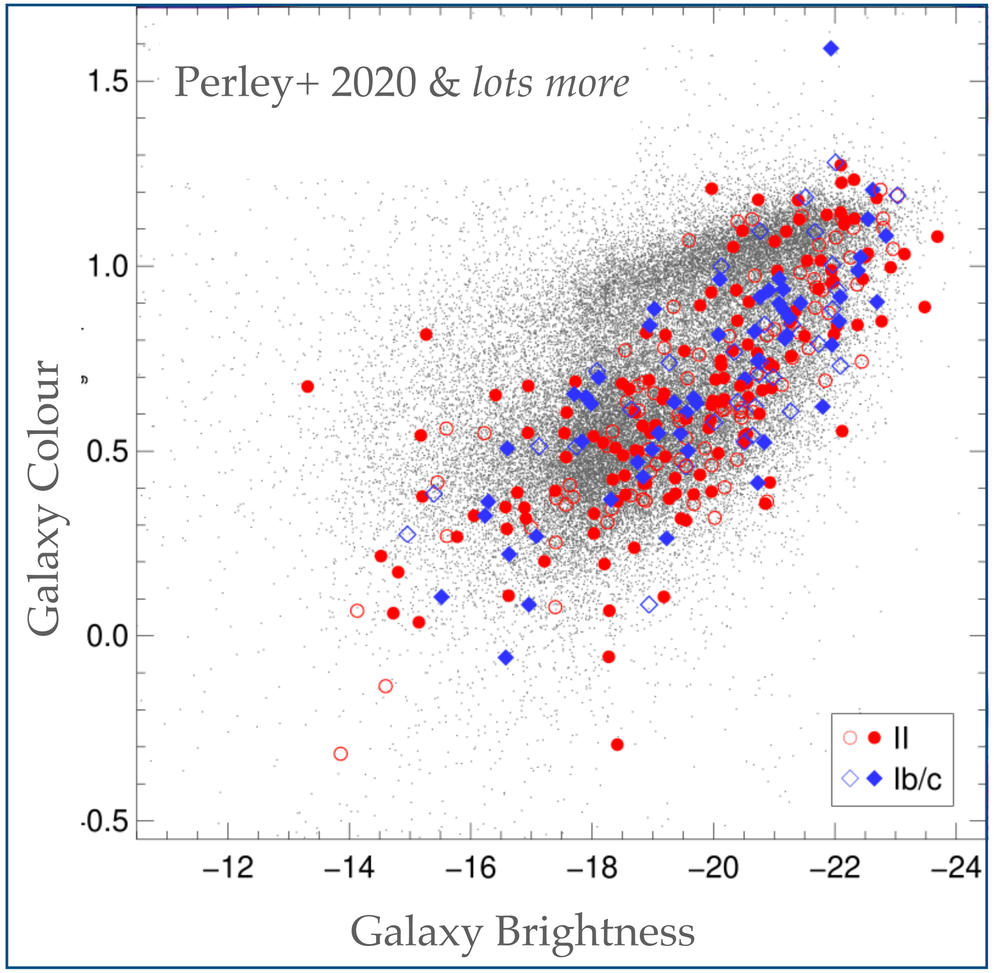
Host Galaxy Identification

Mathew Smith *on behalf of the* **SNIa WG**

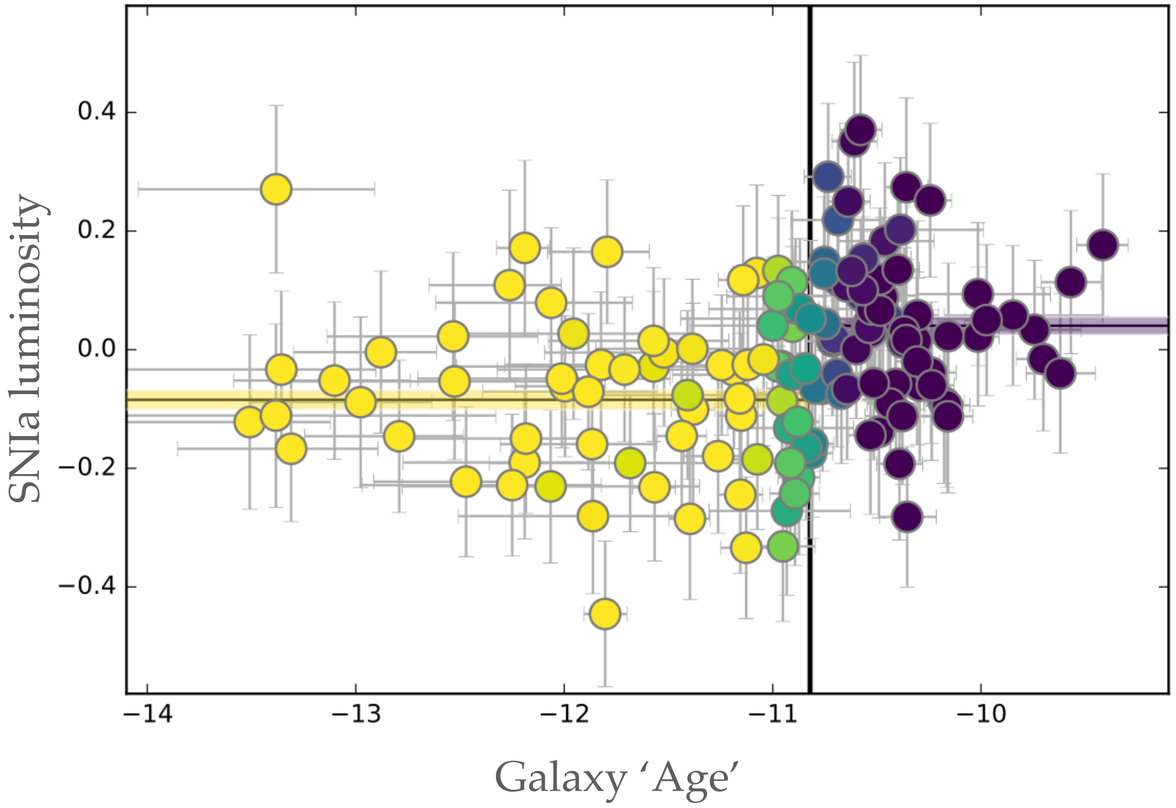
ZWICKY TRANSIENT FACILITY

erc USNAC

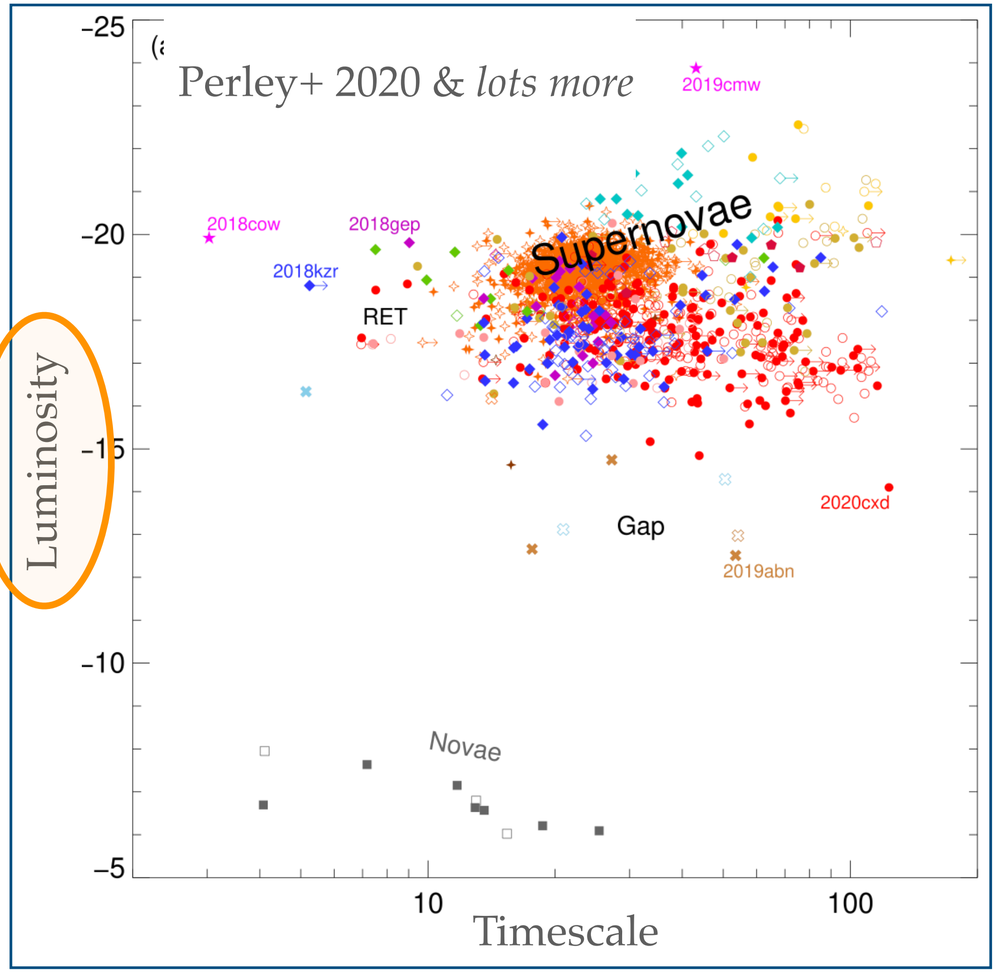
GALAXIES ~ PROGENITORS

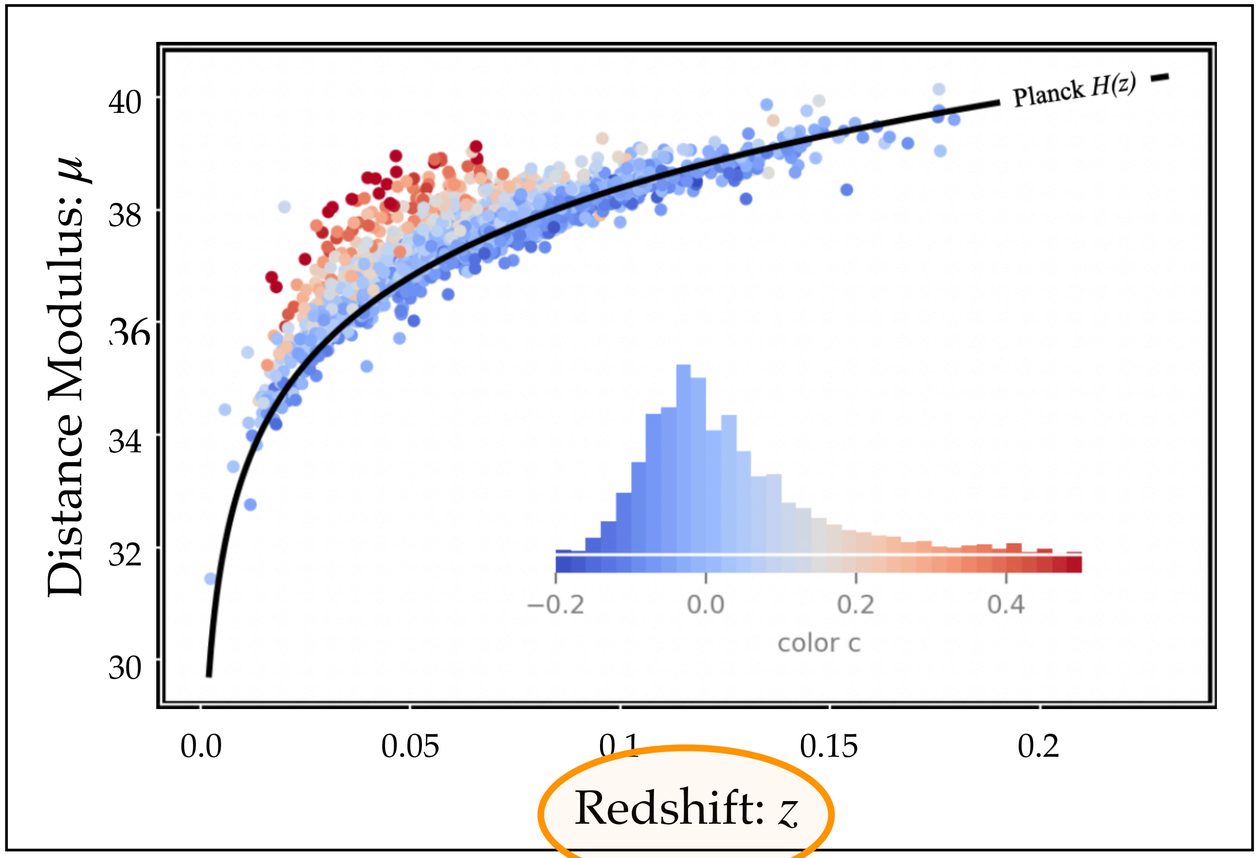


Rigault+ 2020 & *lots more*

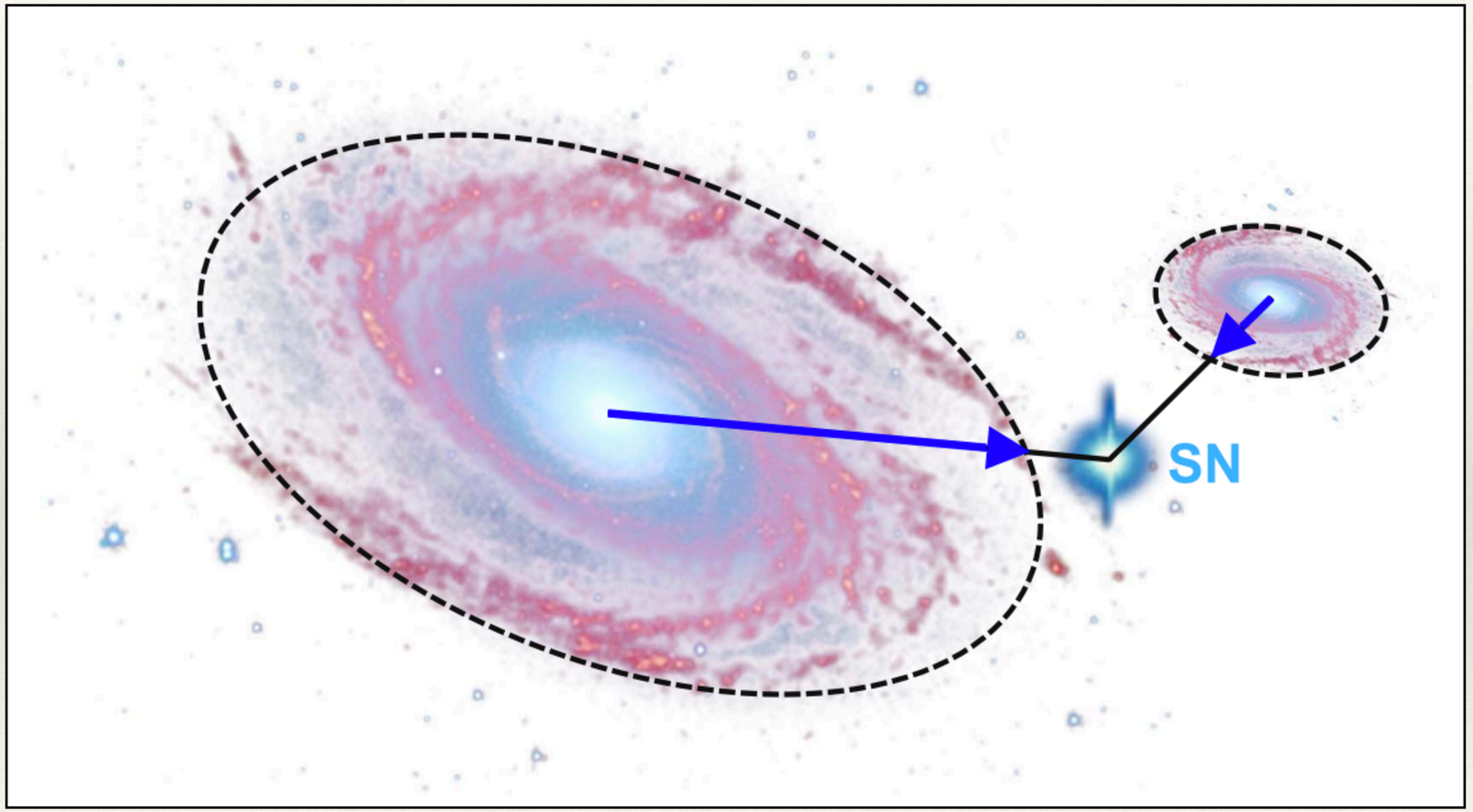


GALAXIES ~ DISTANCES

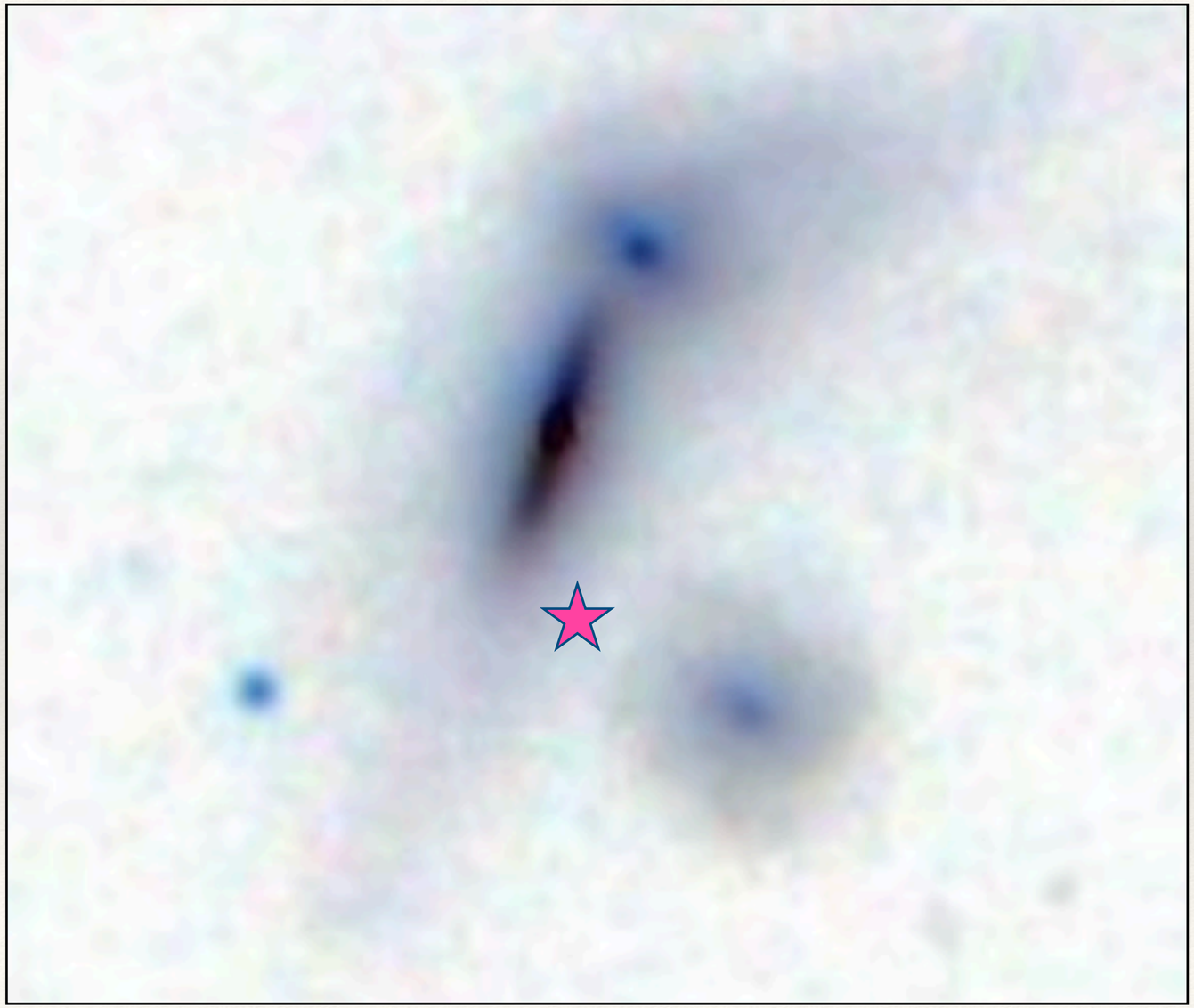




THE PROBLEM



The problem in action



Problems:

What objects are galaxies?

What is the size of a galaxy?

What does closest mean?

ZTF_DR2_Generation : GET_HOST

Python framework

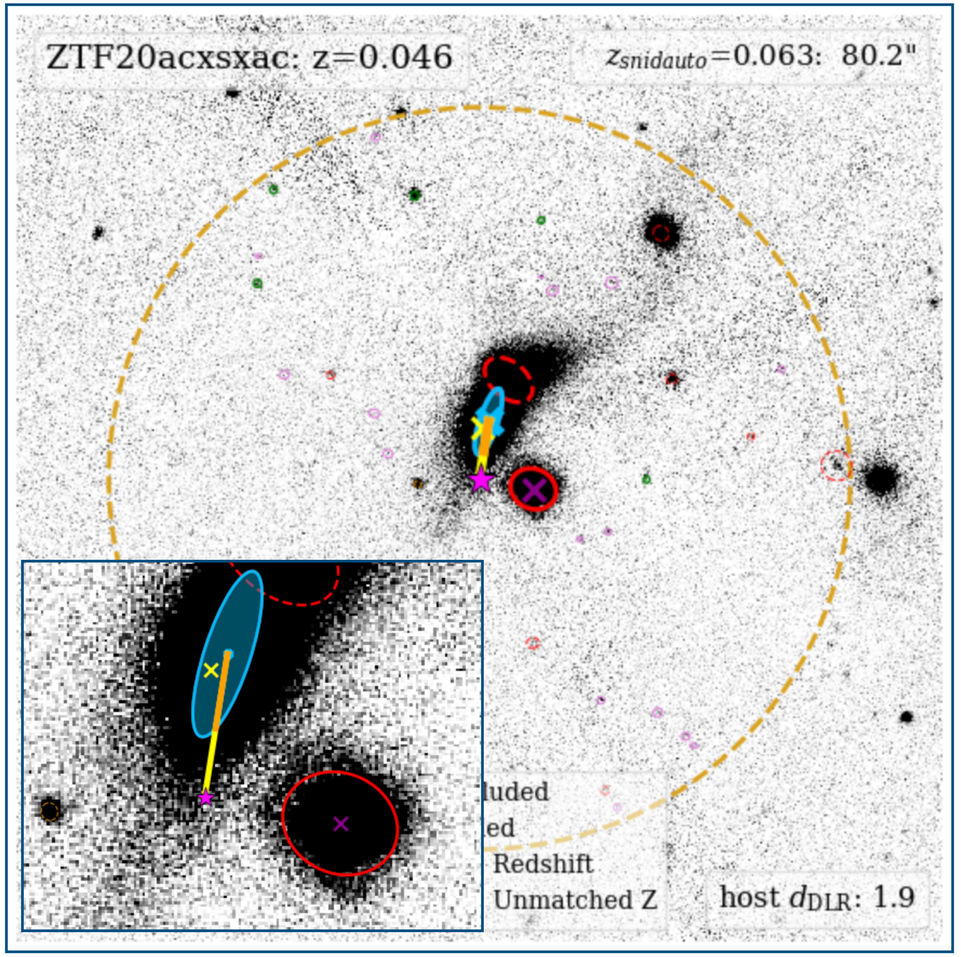
Automated solution

```
from ztfdr2_gen import get_host
ztfname='ZTF20acxsxac'
host_info = get_host.GetHost.get_ztf_env(ztfname, zoom=[1], \
                                         show_fig=True, save_fig=False, \
                                         verbose=False, get_z=True, \
                                         phys_search_radius=100, \
                                         PS1_get_extended=True)

host_info.results
```

ztfname	ra	dec	mag_g	mag_r	mag_z
ZTF20acxsxac	208.52156	33.586071	14.4016	13.9614	13.57

d_DLR	SURVEY	n_dlr5	valid_host
1.913862	PS1	2	1.0



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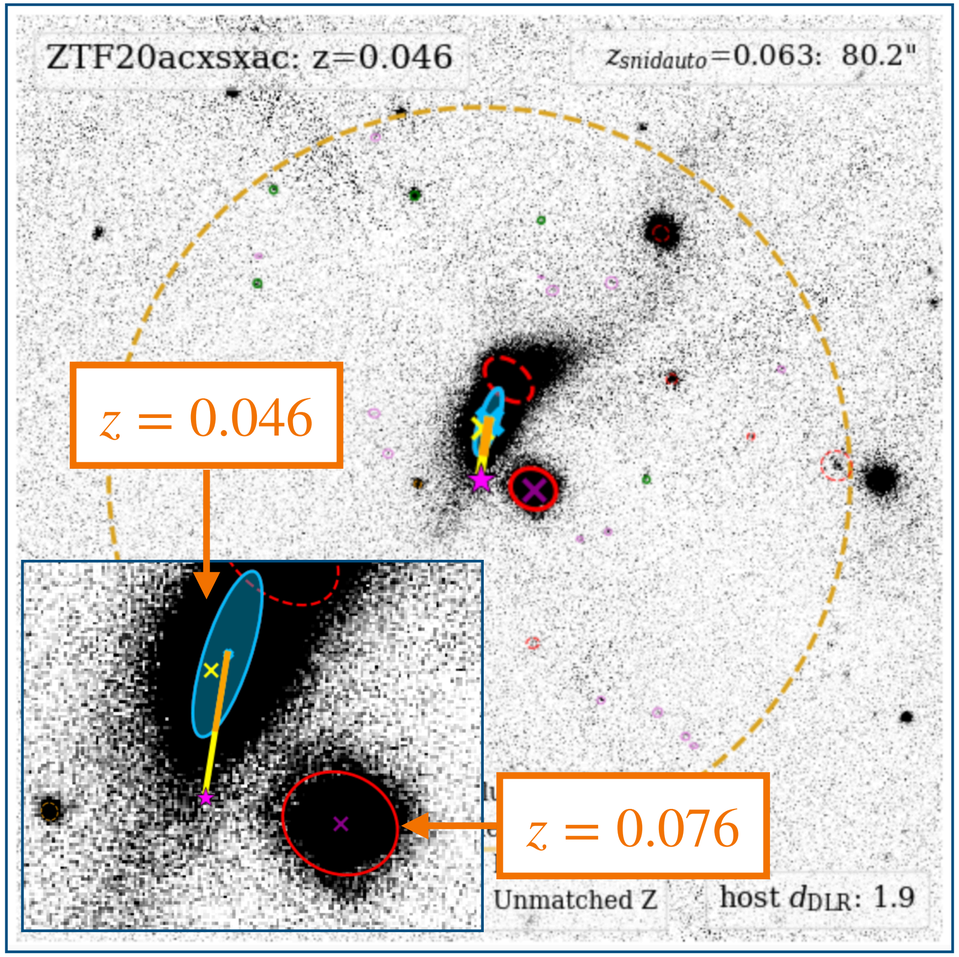


ZTF_DR2_Generation : GET_HOST

Python framework

Automated solution

Draws on 3 static galaxy catalogues:

Legacy Survey, SDSS, PanStarrs

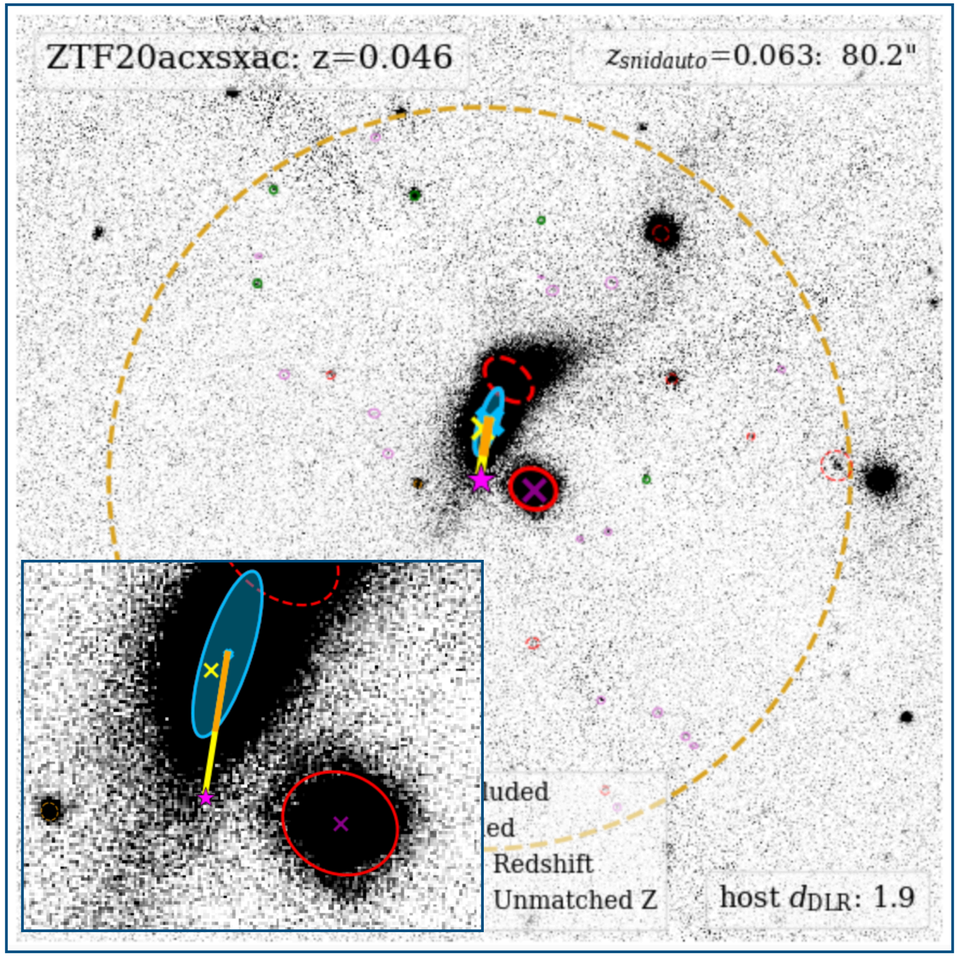
Robust cuts

positions from Fritz; initial redshift to aid cross-match and cuts

Cross matches with static redshift catalogues

SDSS, Simbad, NED

Most recent redshift used; consistency calculated



ZTF_DR2_Generation : GET_HOST

Python framework

Automated solution

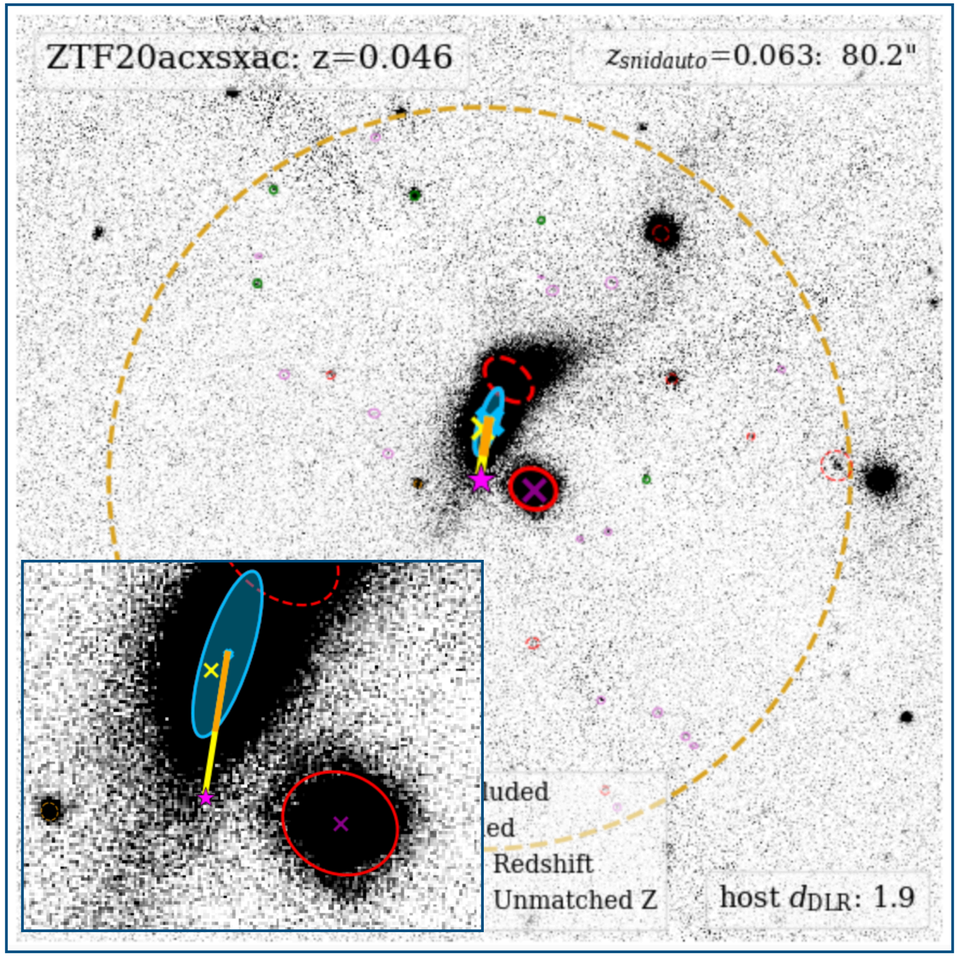
python: *astroquery* + *astropy* + *pandas*

Total time 5s

Limiting factors:

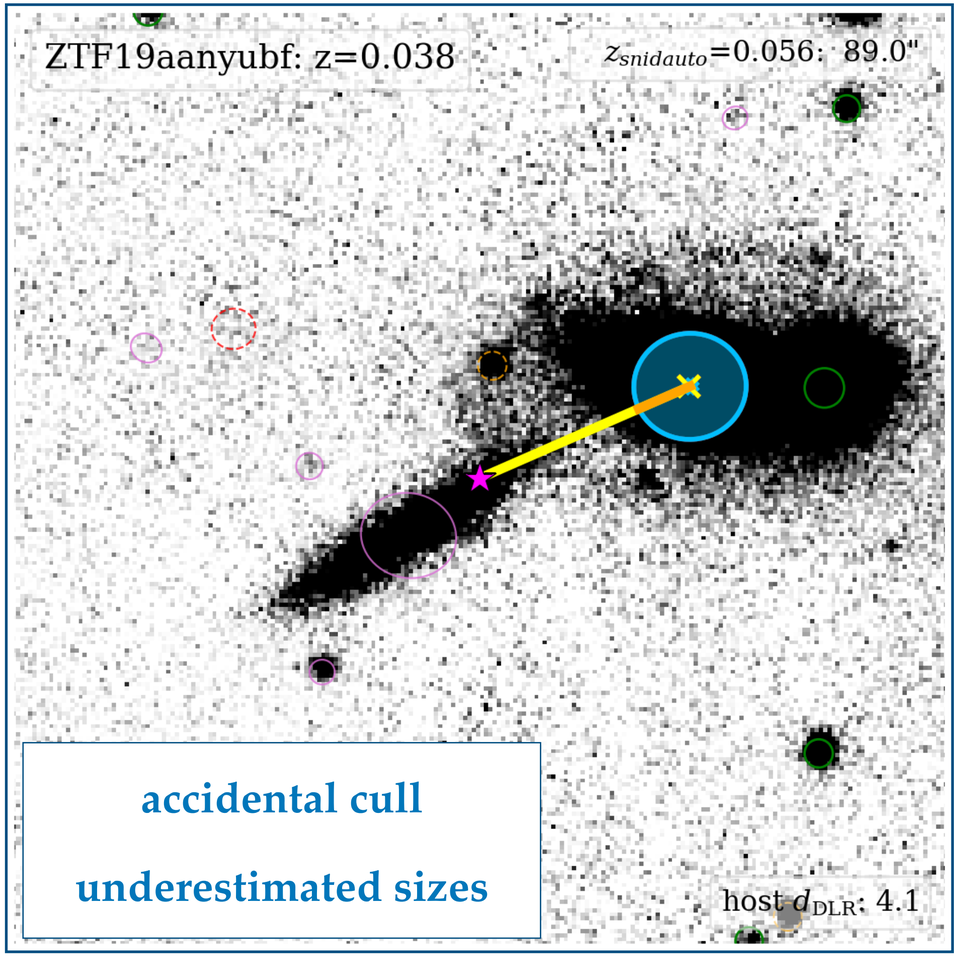
Catalogue cross-match

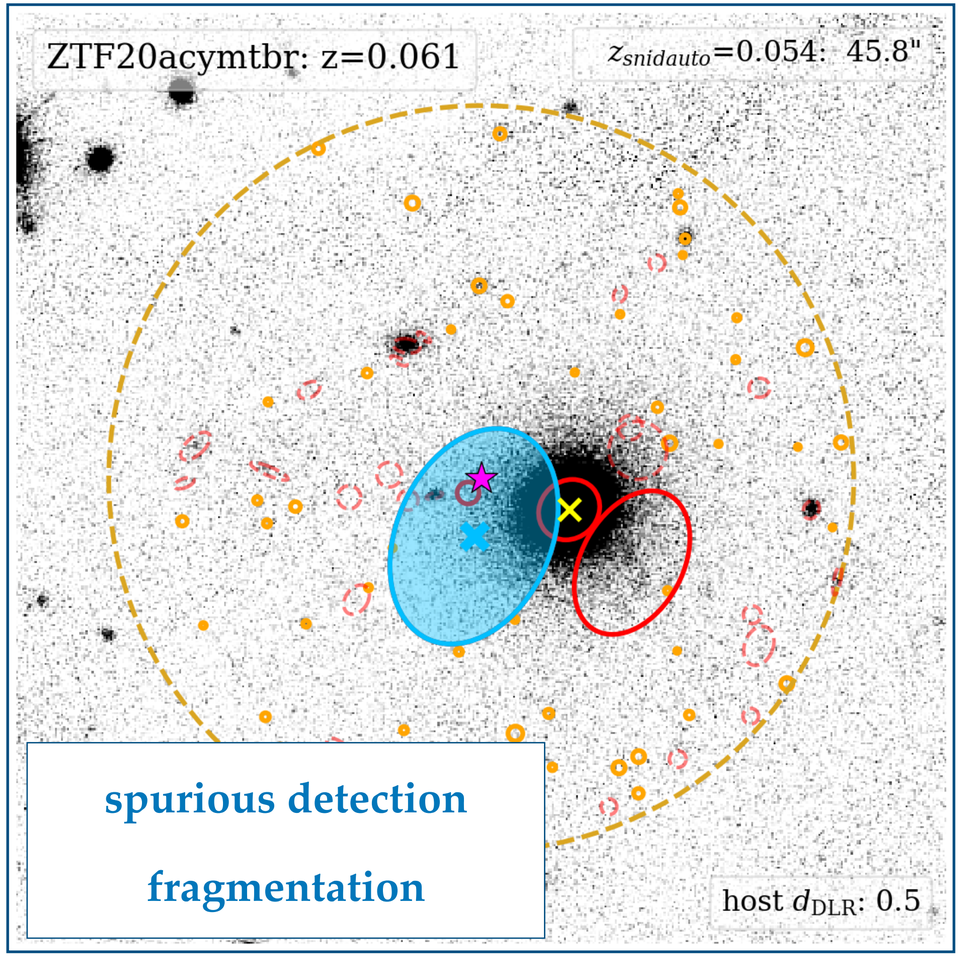
Query limits *Maintenance* *Database load*



Typical Problem Cases

95% success rate

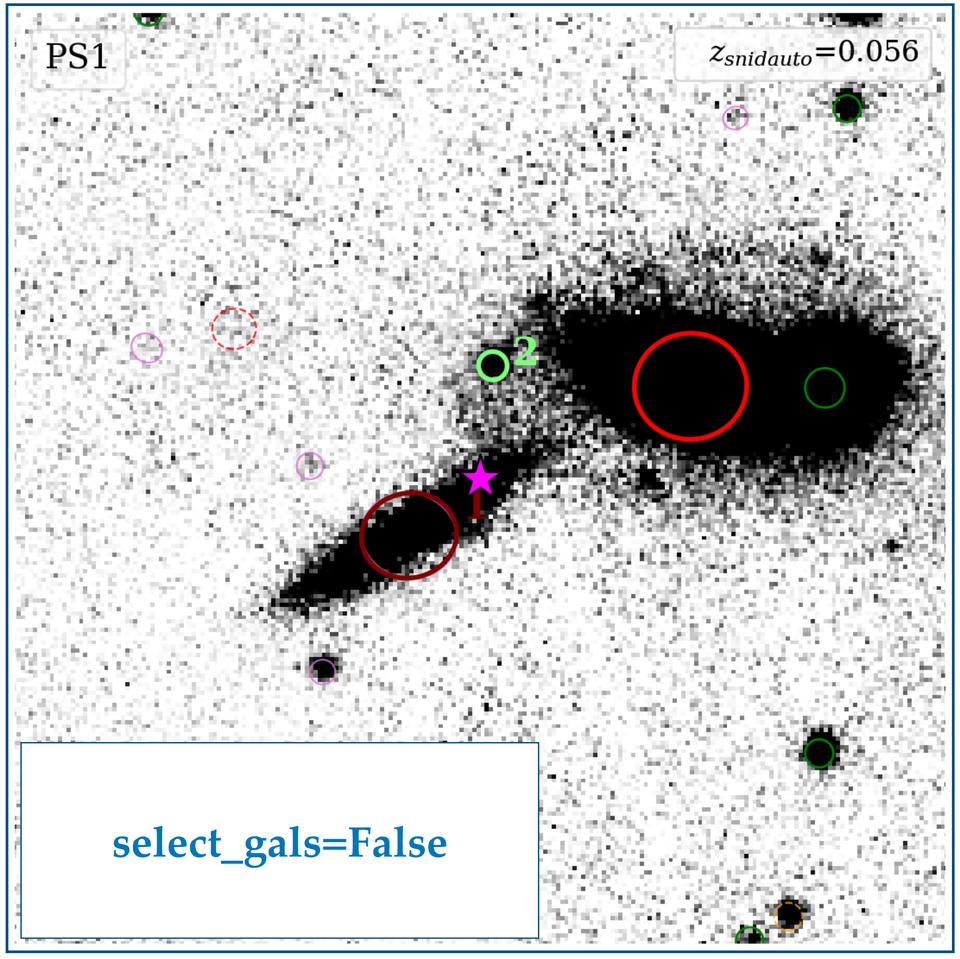




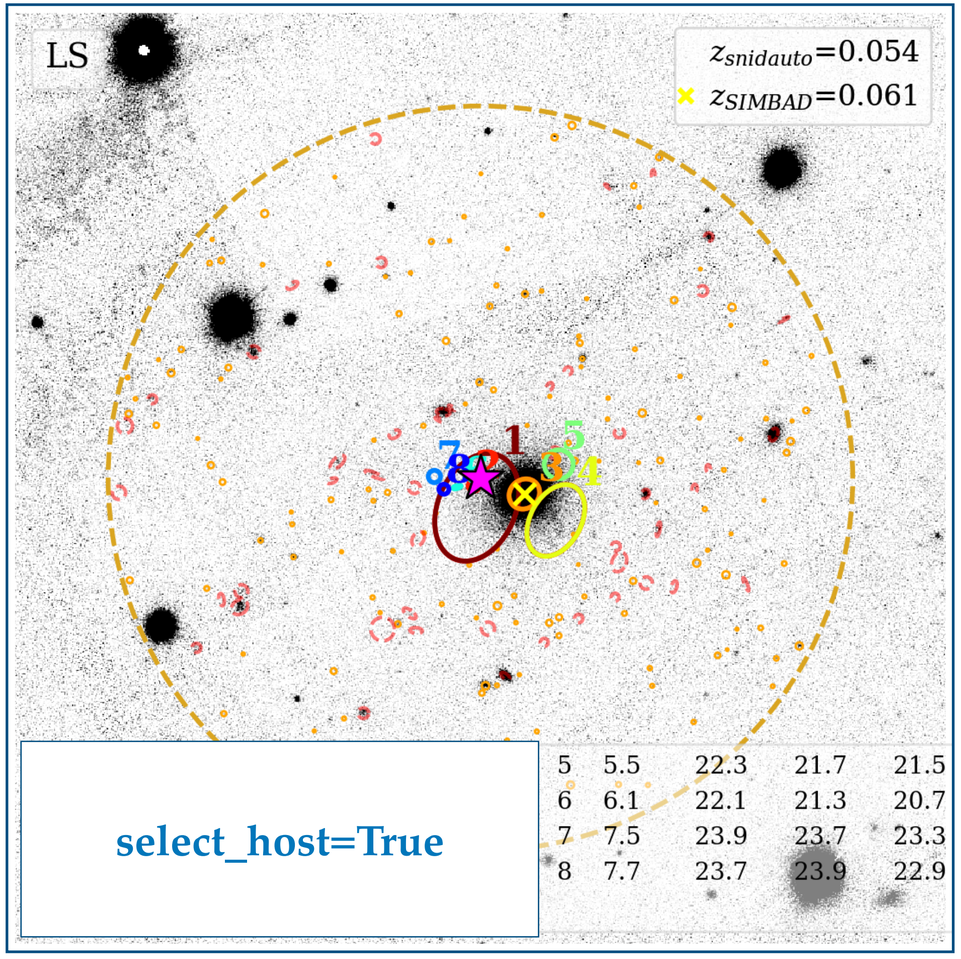
Typical Problem Cases

95% success rate

Quick and Easy Visualisations



select_gals=False



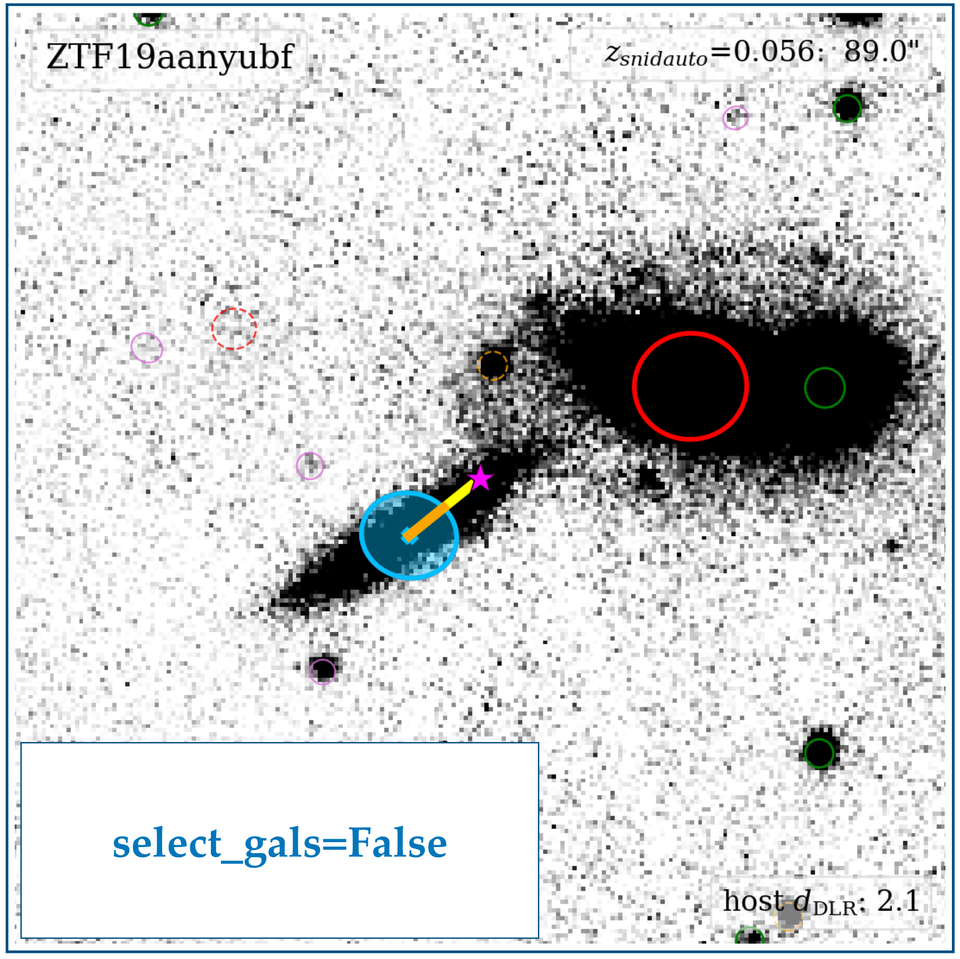
5	5.5	22.3	21.7	21.5
6	6.1	22.1	21.3	20.7
7	7.5	23.9	23.7	23.3
8	7.7	23.7	23.9	22.9

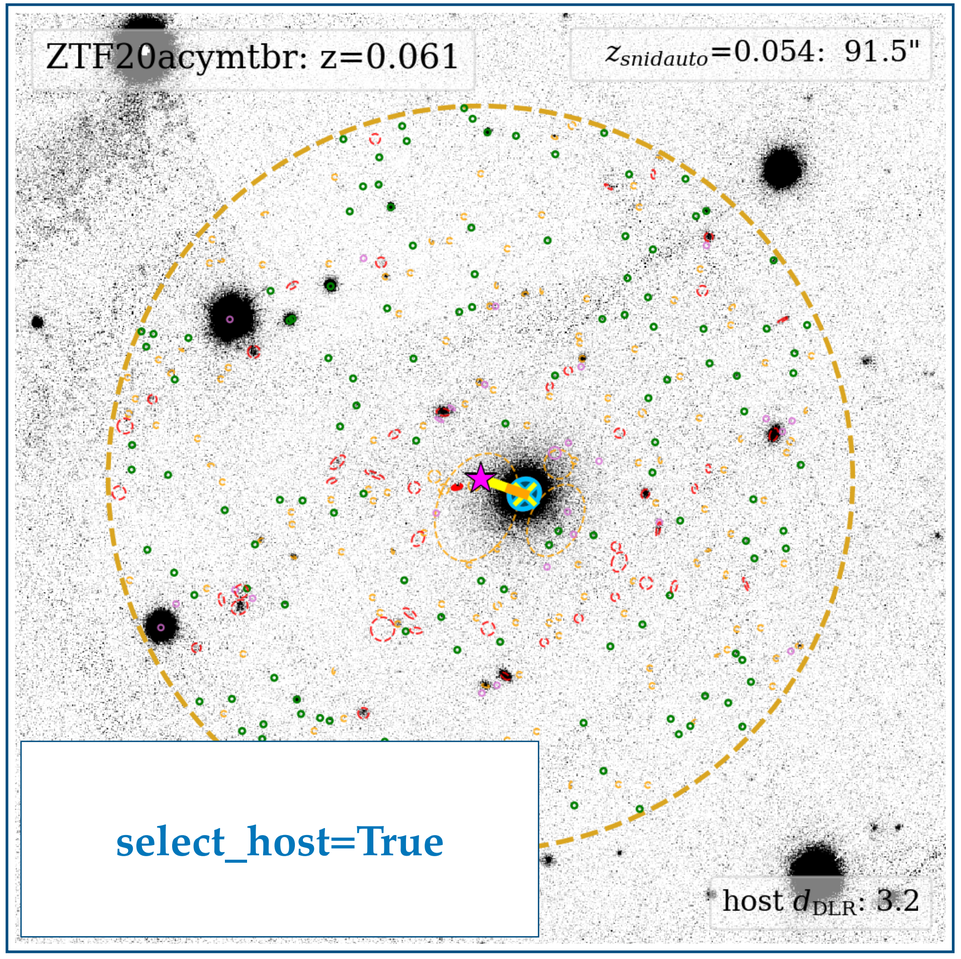
select_host=True

Quick, simple solutions

>99% success rate

Quick and Easy Visualisations





Summary

ZTF-DR2 (3,500 events) :

associations done < 12 hours

cross-check visualisation <1 week

Multi λ, physical properties :

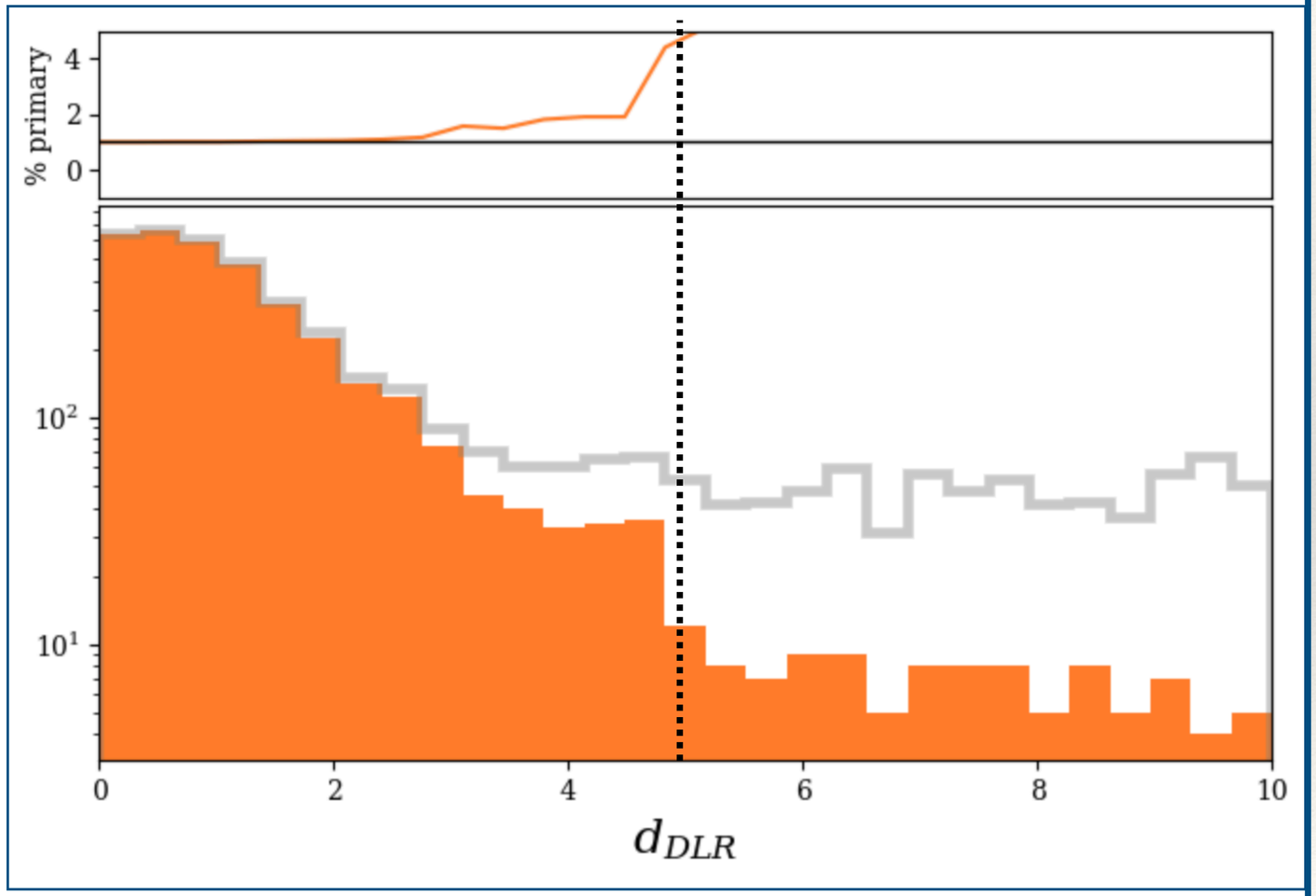
BTS + SNIa: ongoing

Limiting factors: *automation* of

Image download

Object detection

Background estimation



Summary

also automated:
baseline correction & lc fits

ZTF-DR2 (3,500 events) :

associations done < 12 hours

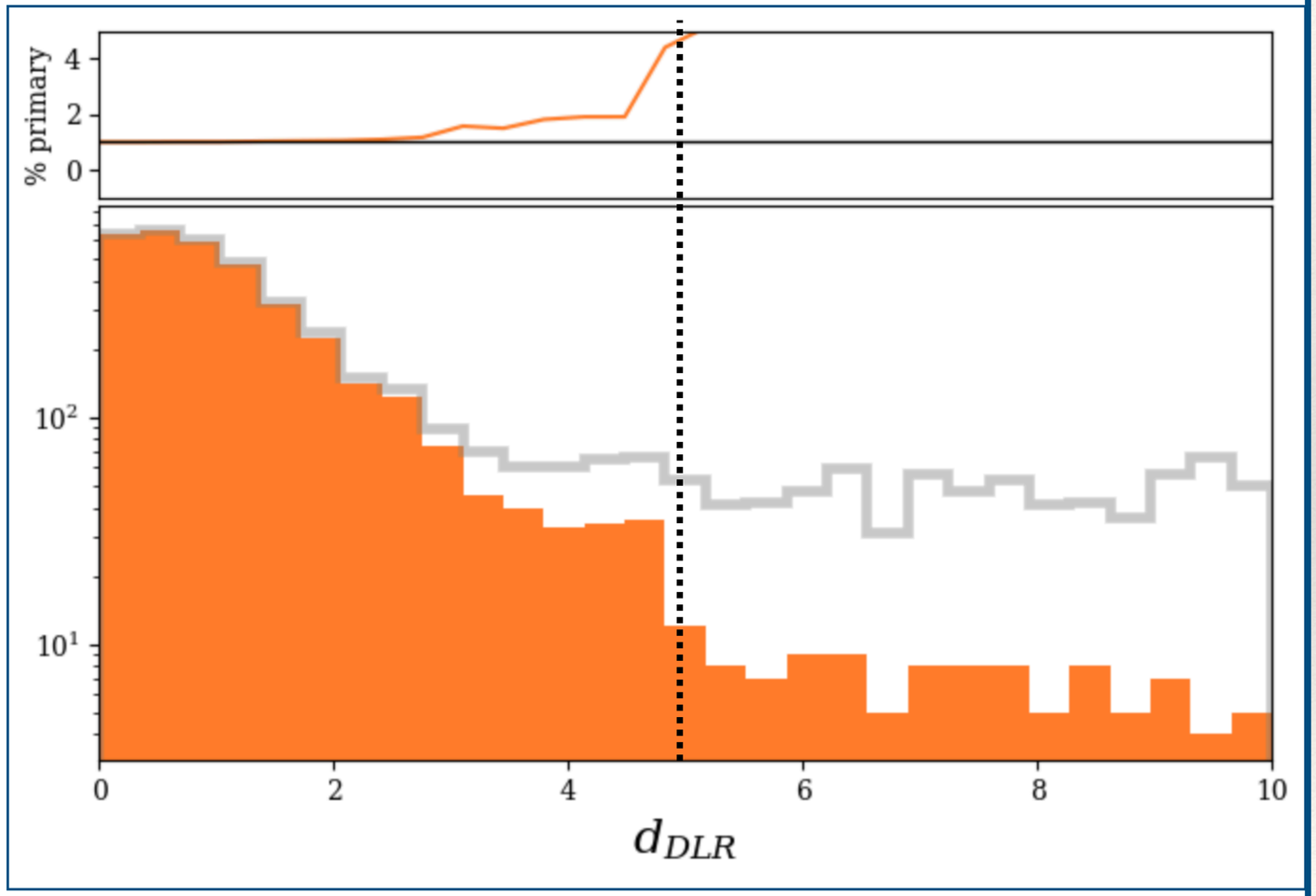
cross-check visualisation <1 week

ZTF-DR3 (30,000 events) :

more automation required

visualisation : *impossible* + *biased*

simulations + AMPEL?



THANK YOU :-)