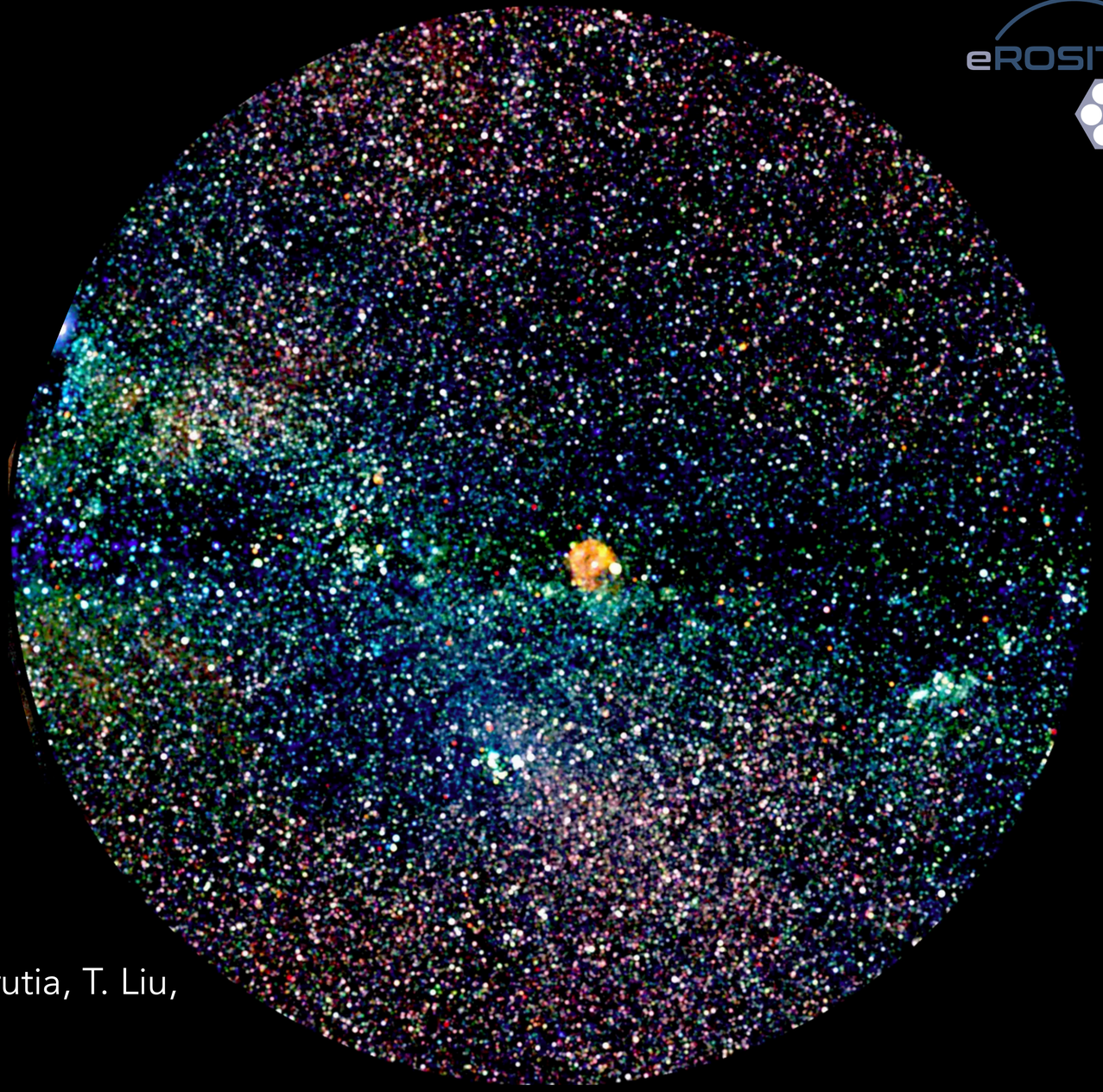
The first eROSITA All-Sky Survey: AGN content



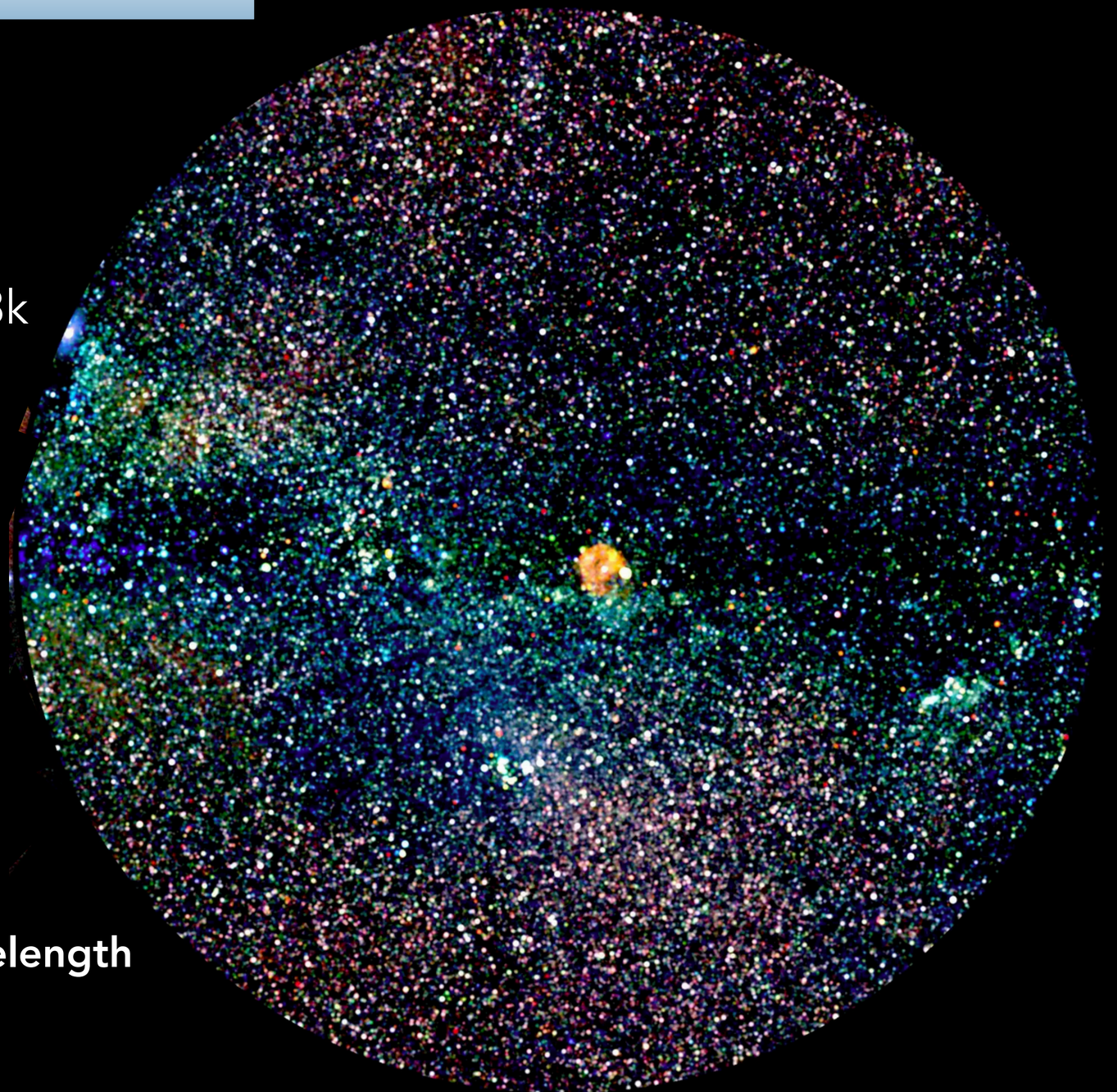
Mara Salvato (MPE)
On behalf of the eROSITA-DE/eroAGN team:
J. Wolf, J.Buchner, H. Starck, T. Dwelly, , M. Brusa, R. Shirley
A. Merloni, K. Nandra, S.Waddell, G. Lamer, W. Roster, T. Urrutia, T. Liu,
and many, many more

Talk outlook

From Merloni et al 2024:

1. Soft band 0.2-2.3 keV, Point sources: 903k
2. Hard band 2.3-5 keV, Point Sources: 5.5k

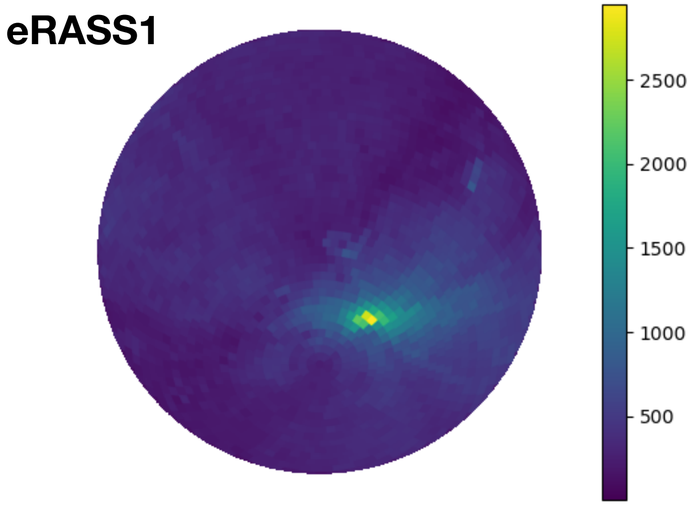
(see S. Waddell talk)



In this talk:

- **Short overview on associations**
- **classification of sources**
- **comparison with AGN selected at other wavelength**
- **remarks**

Counterparts identification depends on ancillary data



Survey	Depth (AB)	Bands	Area	Population
LS10	~24	griz(W1-4)	14k deg^2	all, including clusters
Gaia	20	Gr,Gb,G	all-sky	stars, compact objects,qso
CW2020	20.4, 20.8	W1,W2	all-sky	cold stars, QSO, AGN

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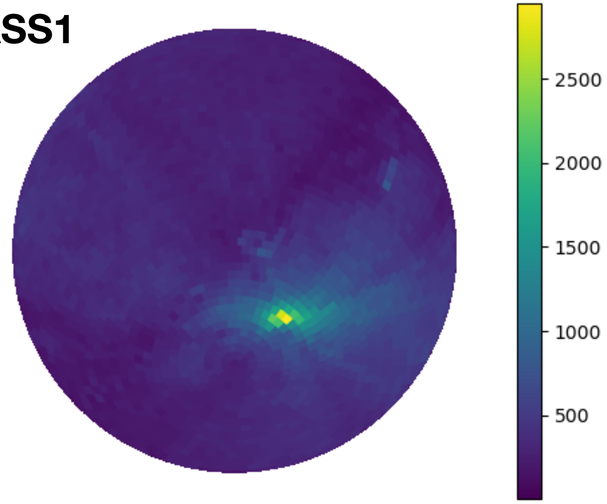
eRASS1



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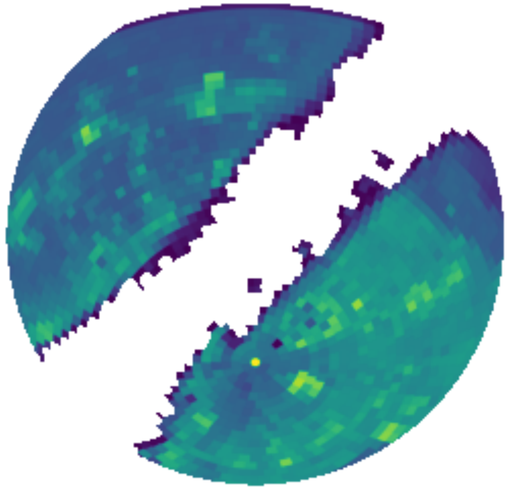
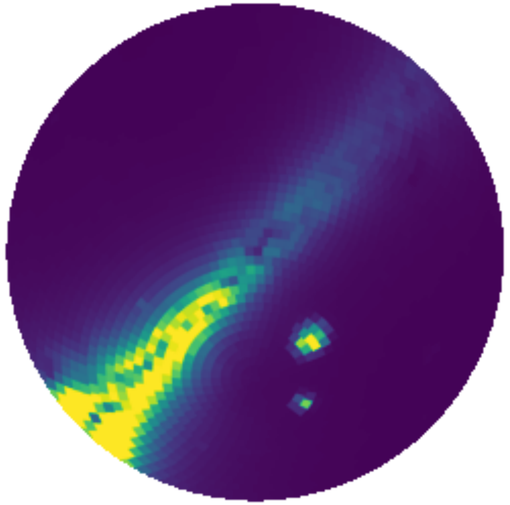
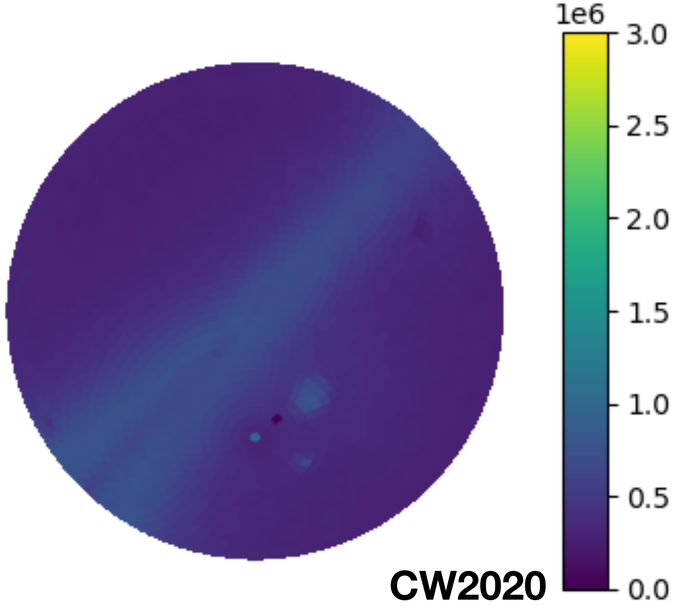


LS10



Gaia DR3



CW2020

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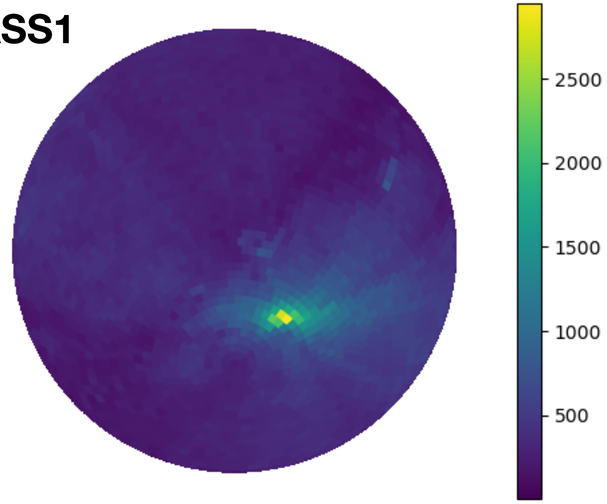

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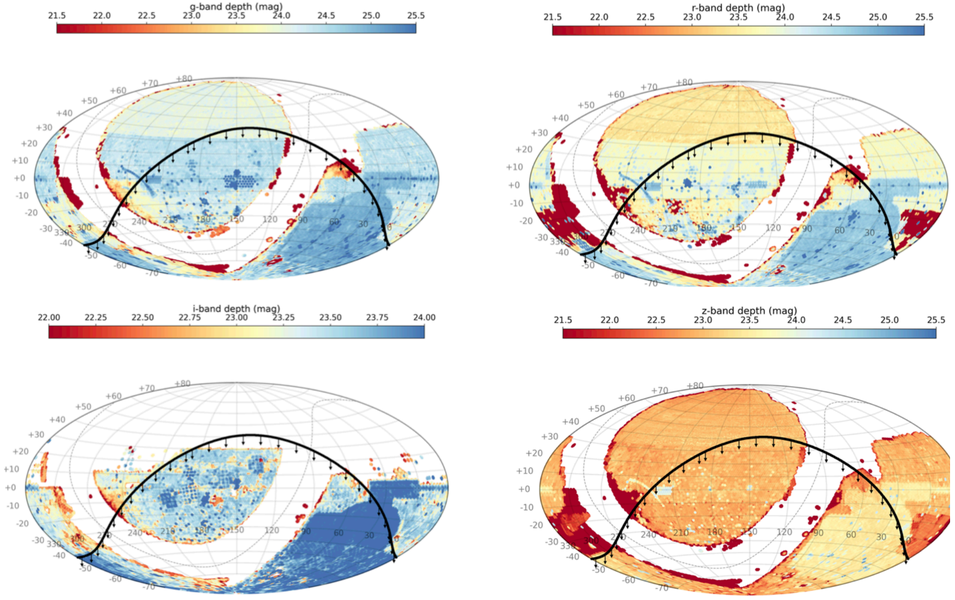
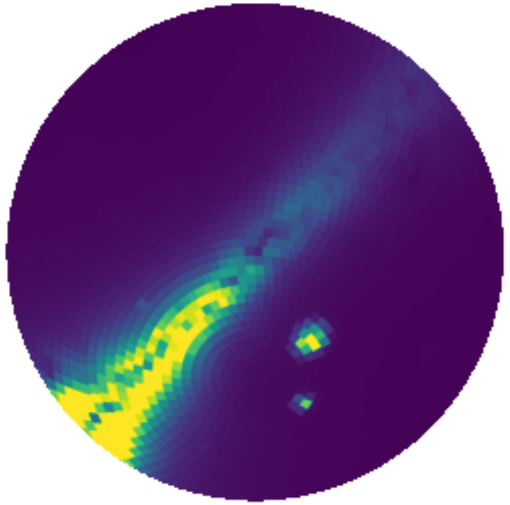
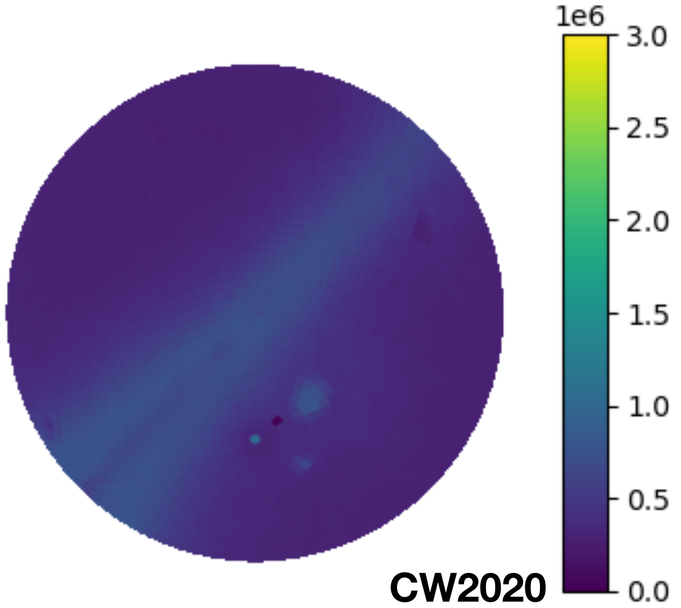




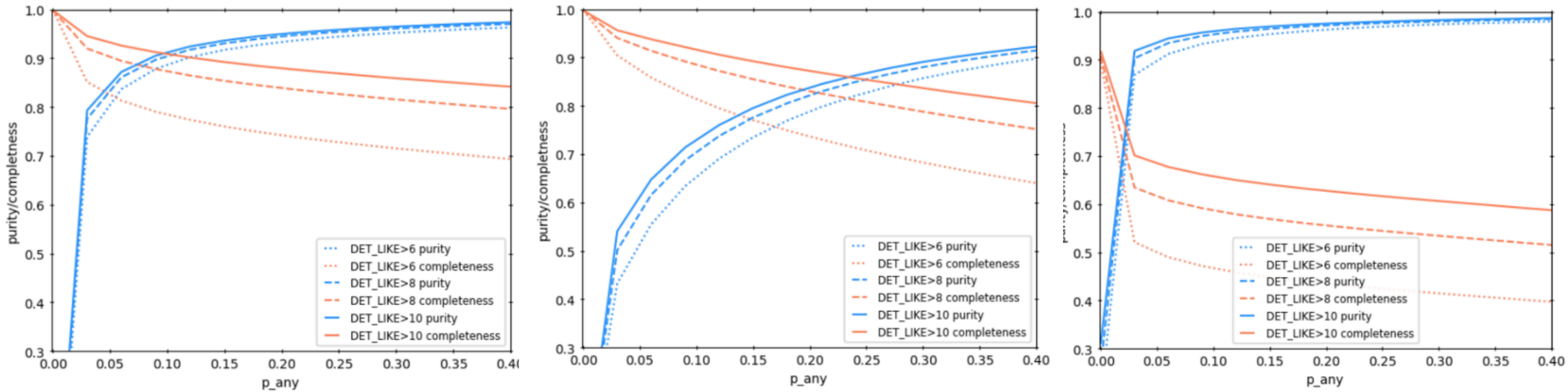
Gaia DR3



CW2020

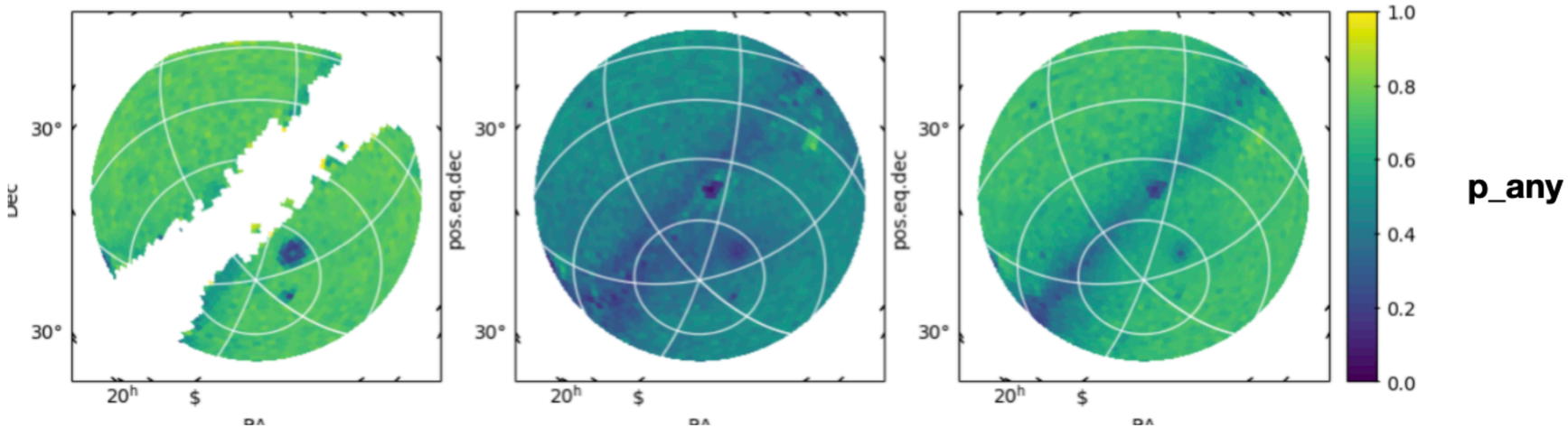
eRASS1 counterparts (NWAY,Salvato+2018)

LS10 **CW2020** **Gaia DR3**



p_any

LS10 **CW2020** **Gaia DR3**

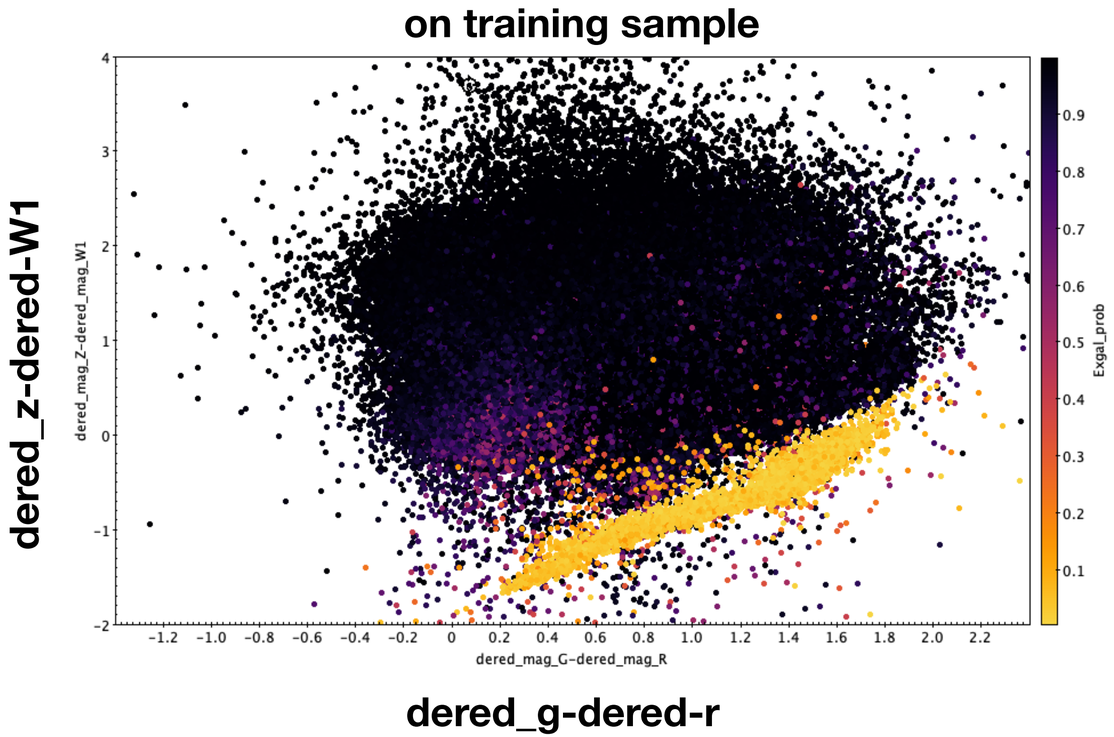


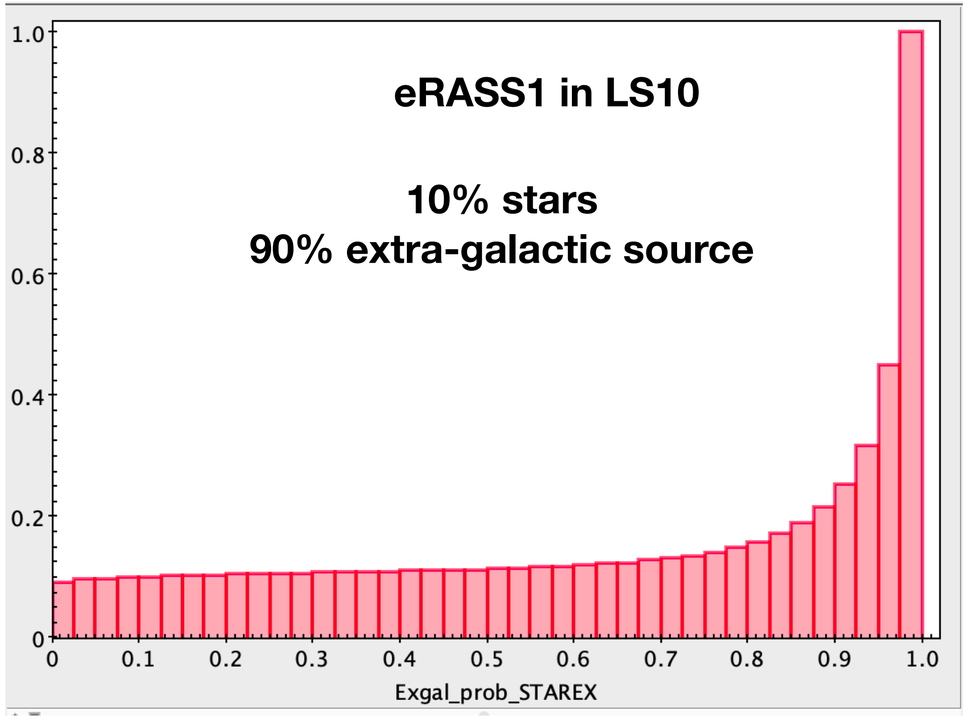
p_any

Salvato et al 2024

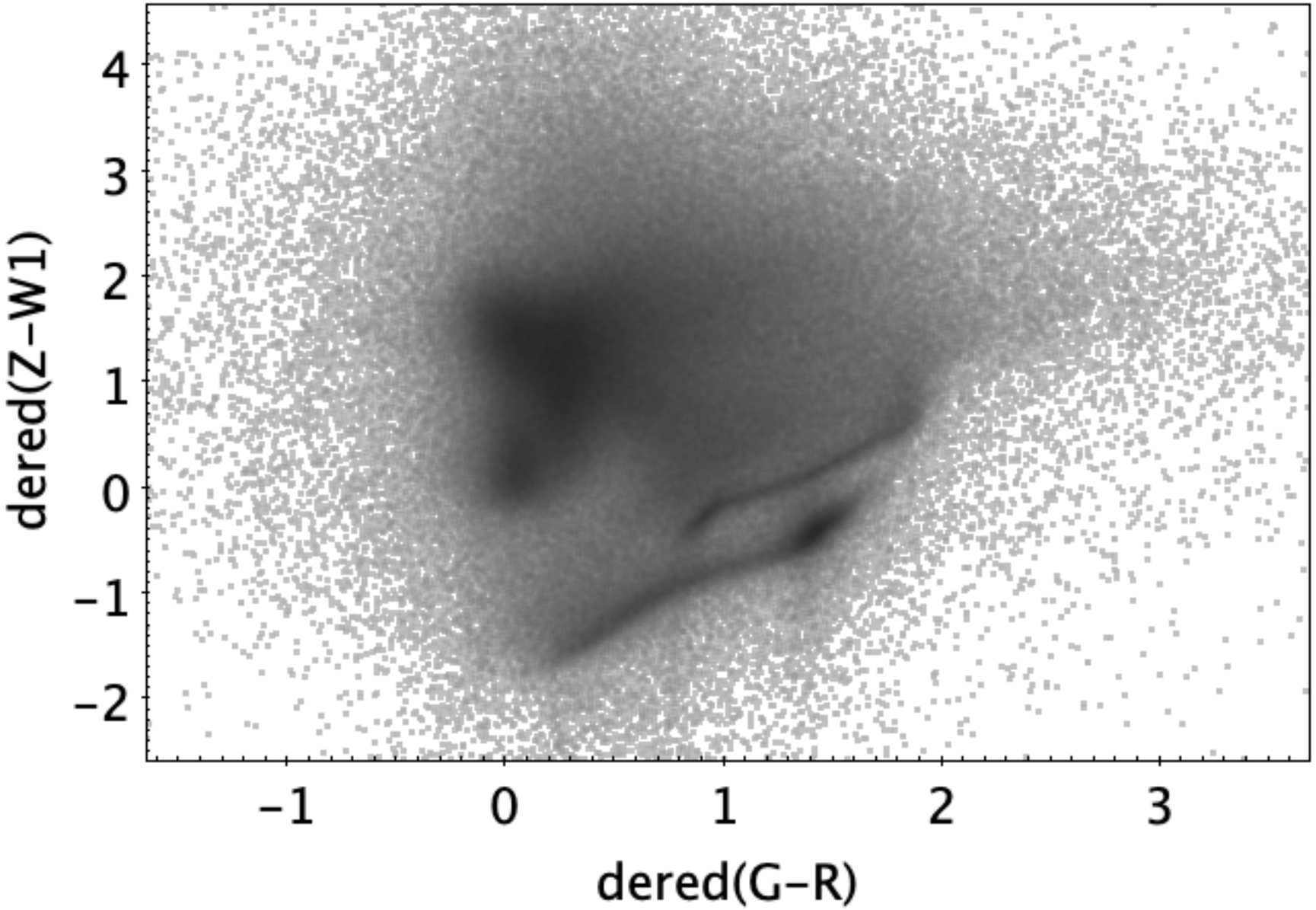
Classification via STAREX (Shashwat Tiwari)

Training sample of 22252 correctly classified sources (7735 galactic and 14517 extragalactic)
6 features from eROSITA and LS10 (X-ray flux, g,r,z,w1, TYPE) + 4 features from Gaia (mag and parallax), when available
Accuracy = >98%





750 000 sources in the LS10 area



Salvato et al 2024

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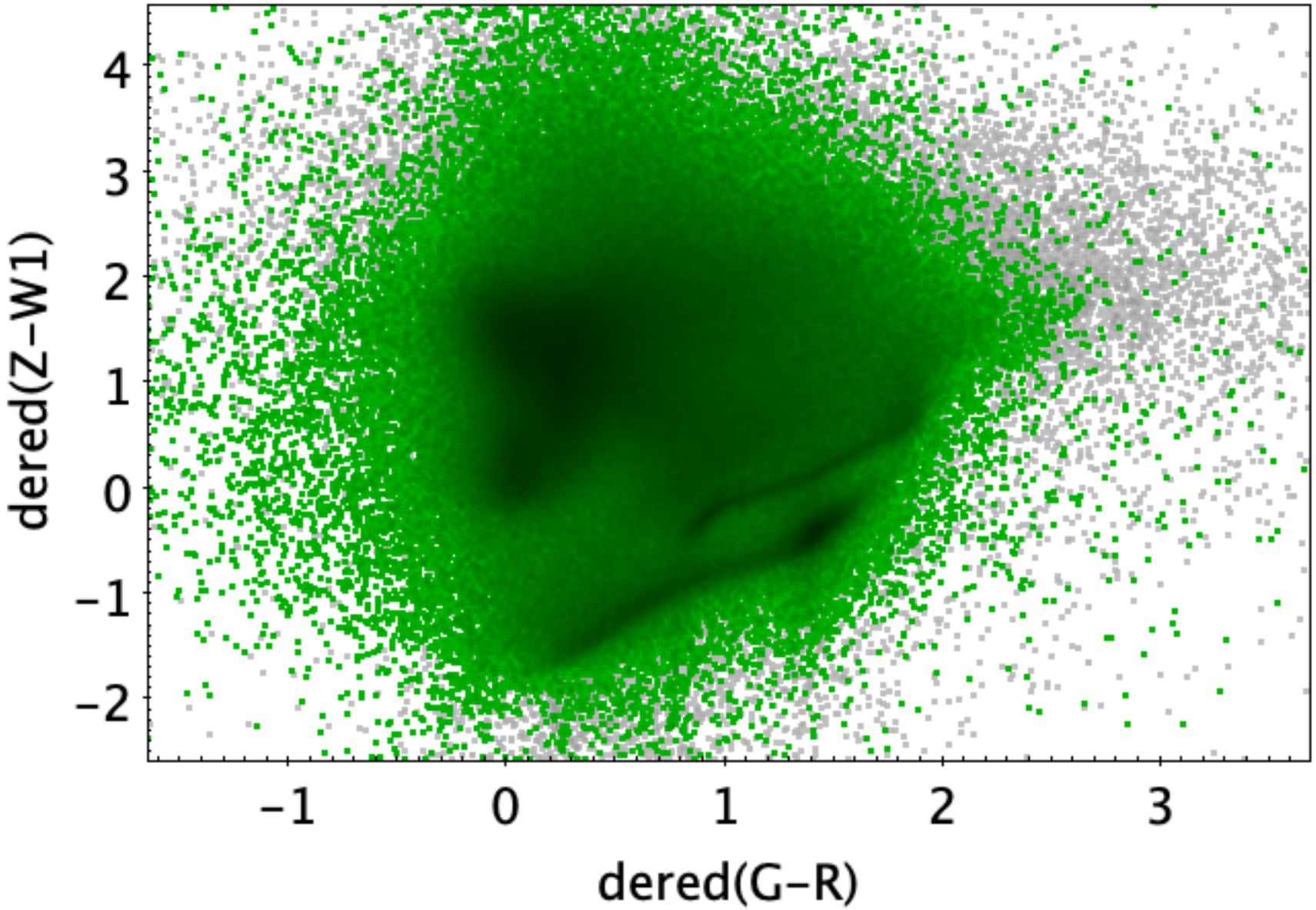

Salvato et al 2024

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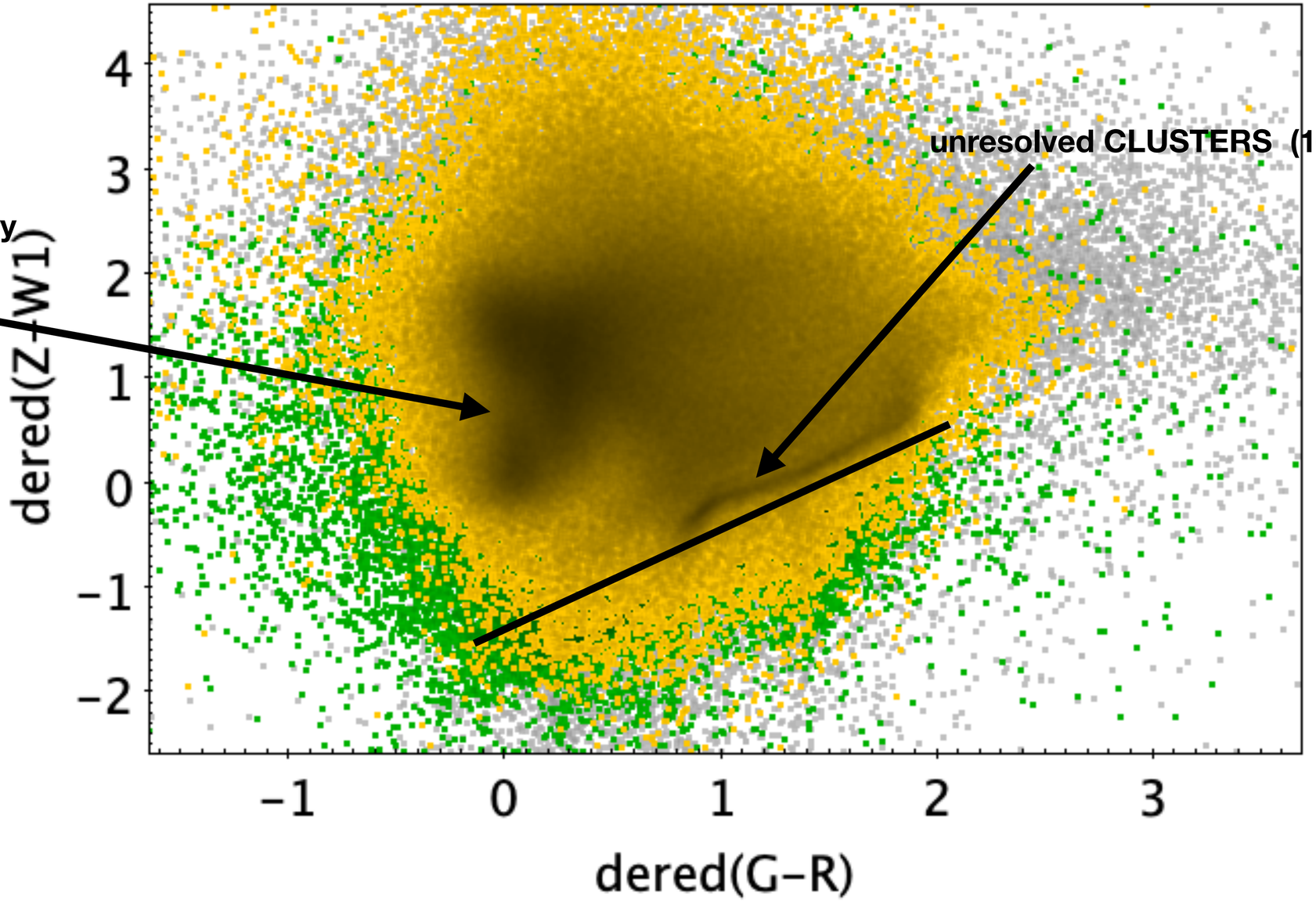
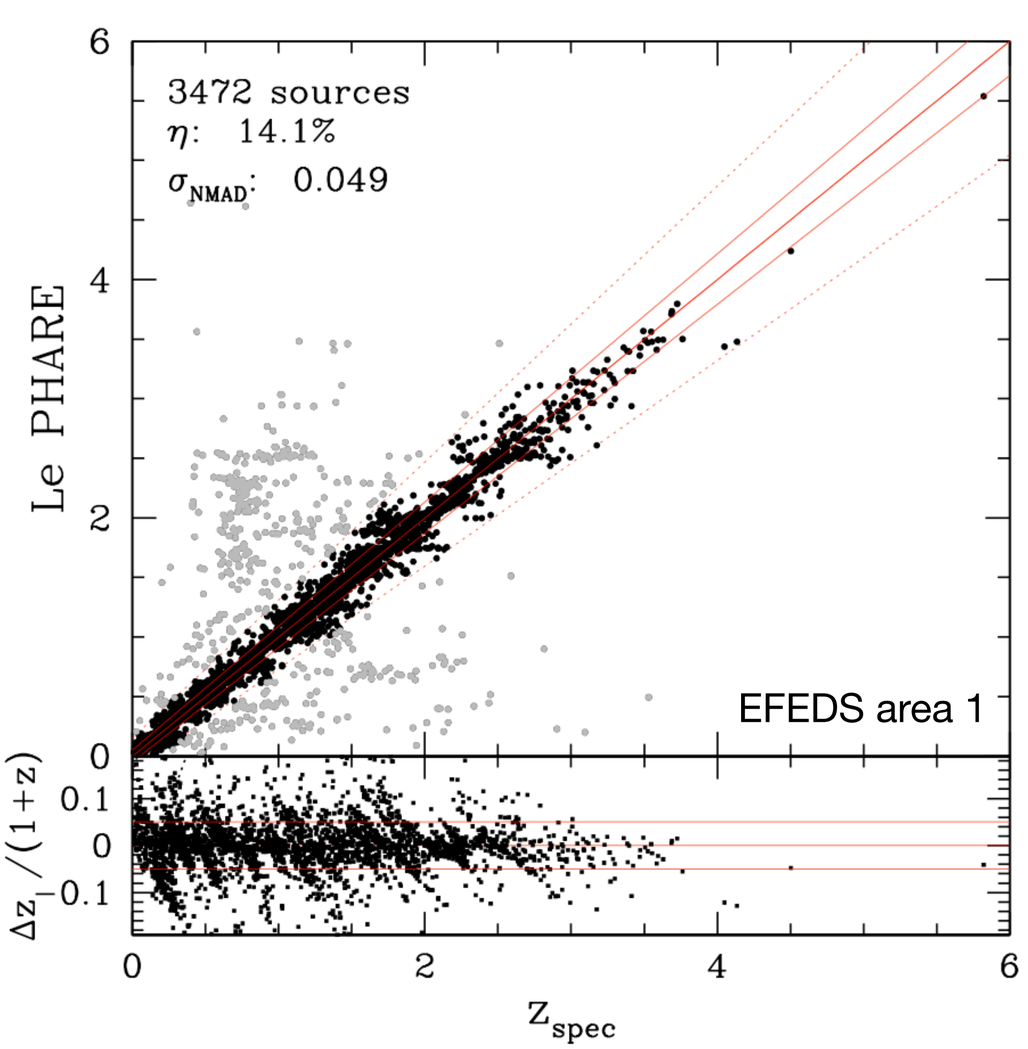


about 550k AGN
with good photometry
(SNR>3 in 6 bands)

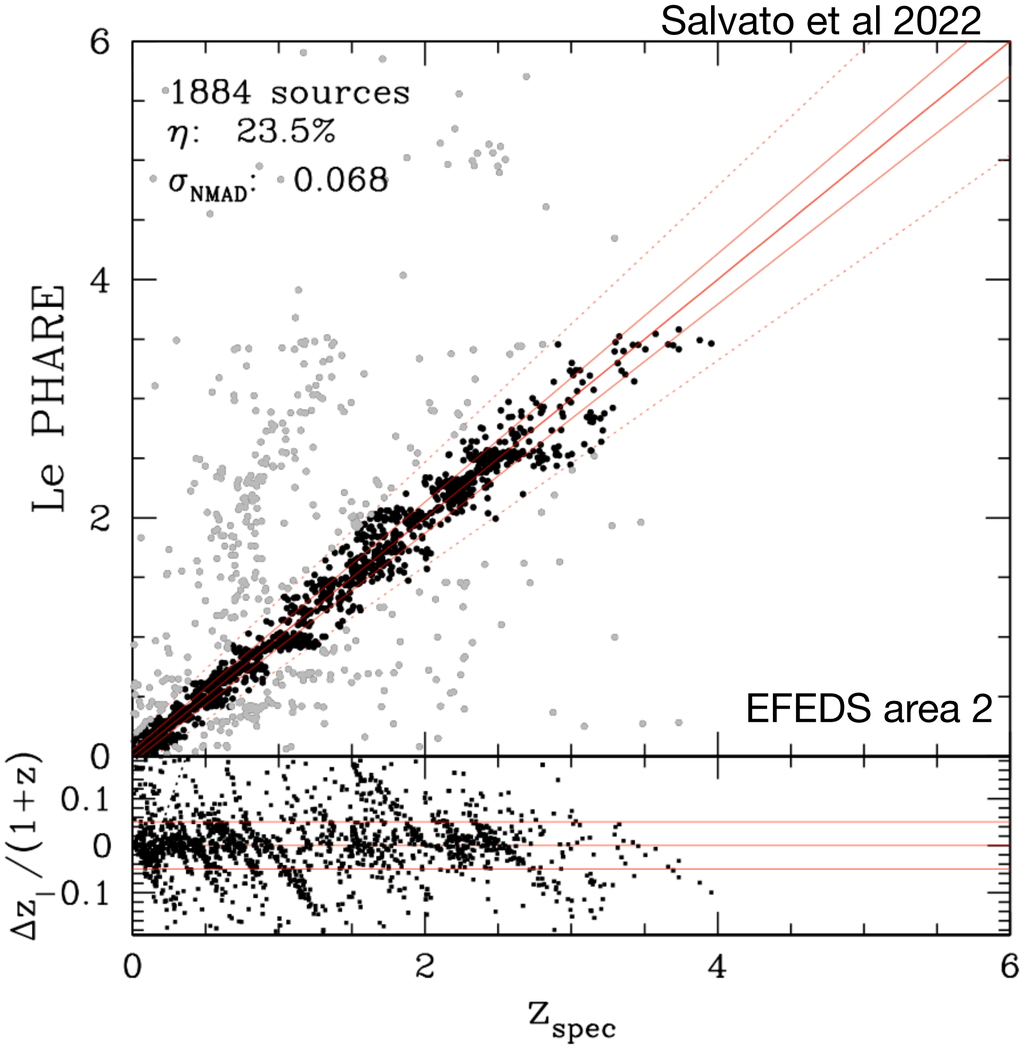
unresolved CLUSTERS (16k), Balzer et al in prep)

Salvato et al 2024

eRASS1 photoz better than in eFEDS!



Salvato et al 2022



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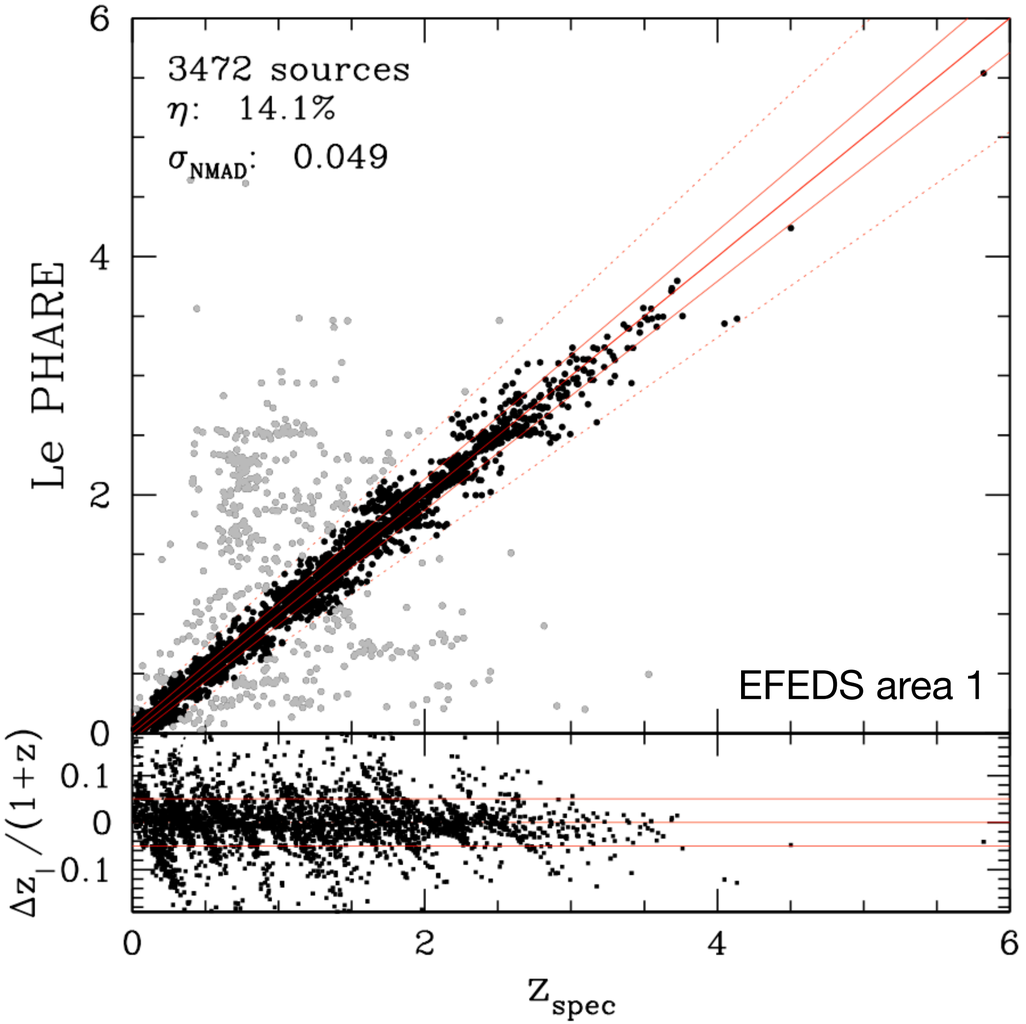
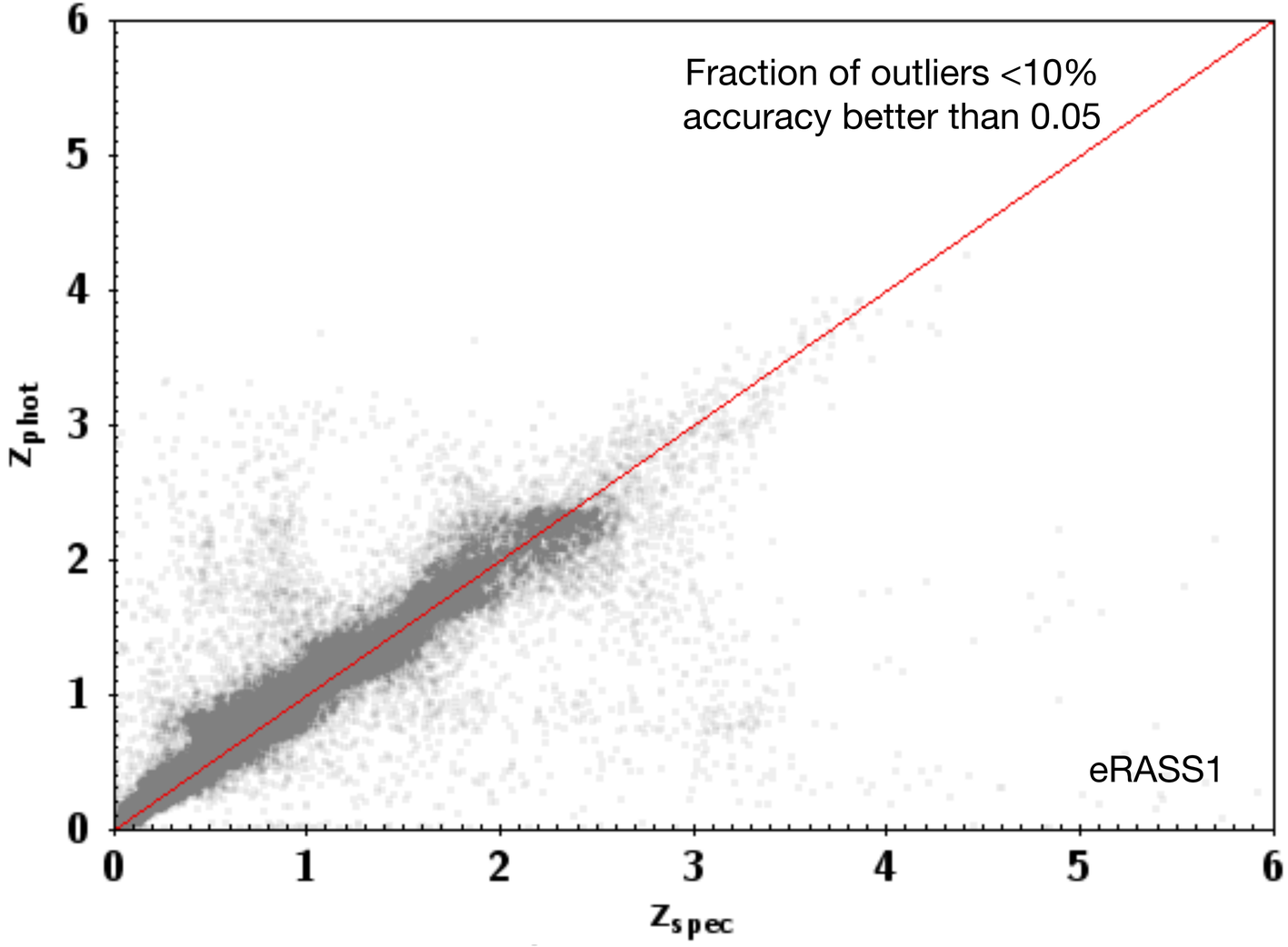
Using CIRCLEZ (ML on parametrized LS10 images)
(Saxena, MS, et al 2024)





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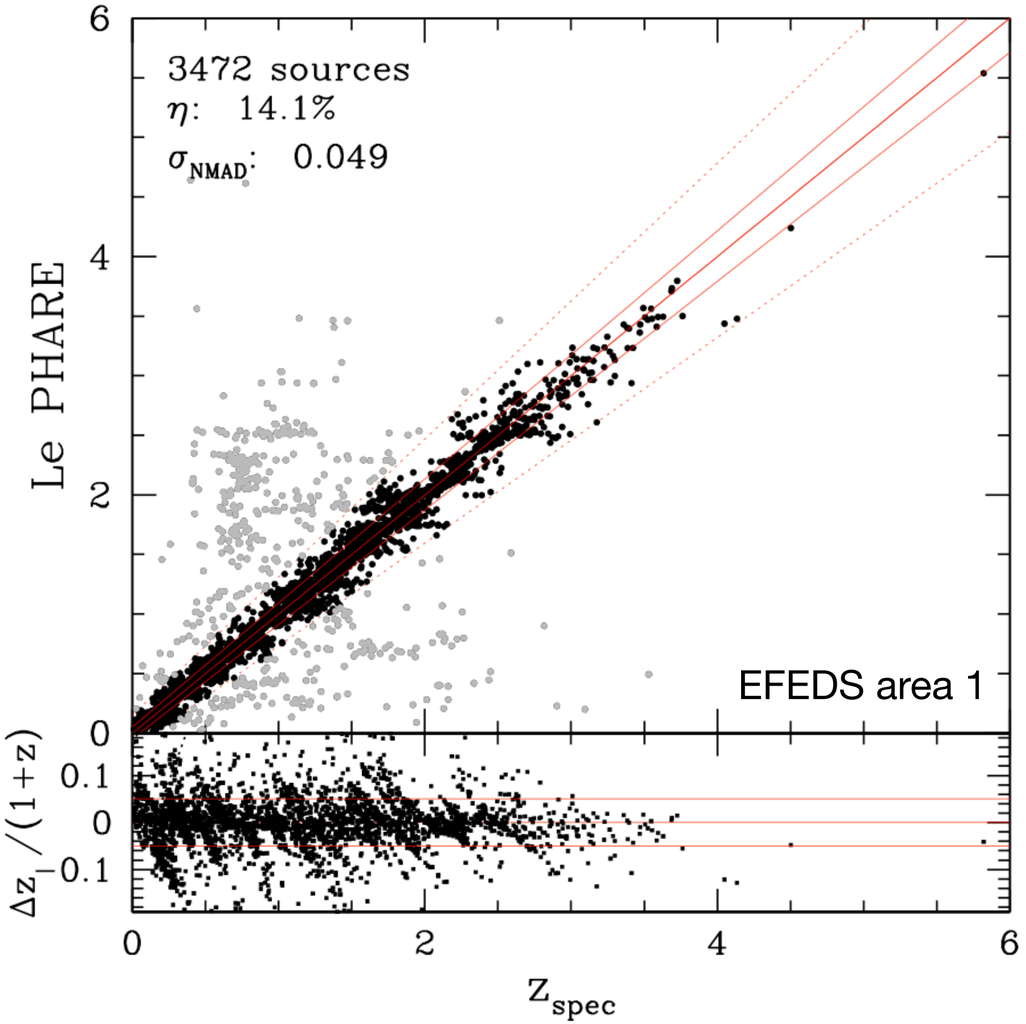
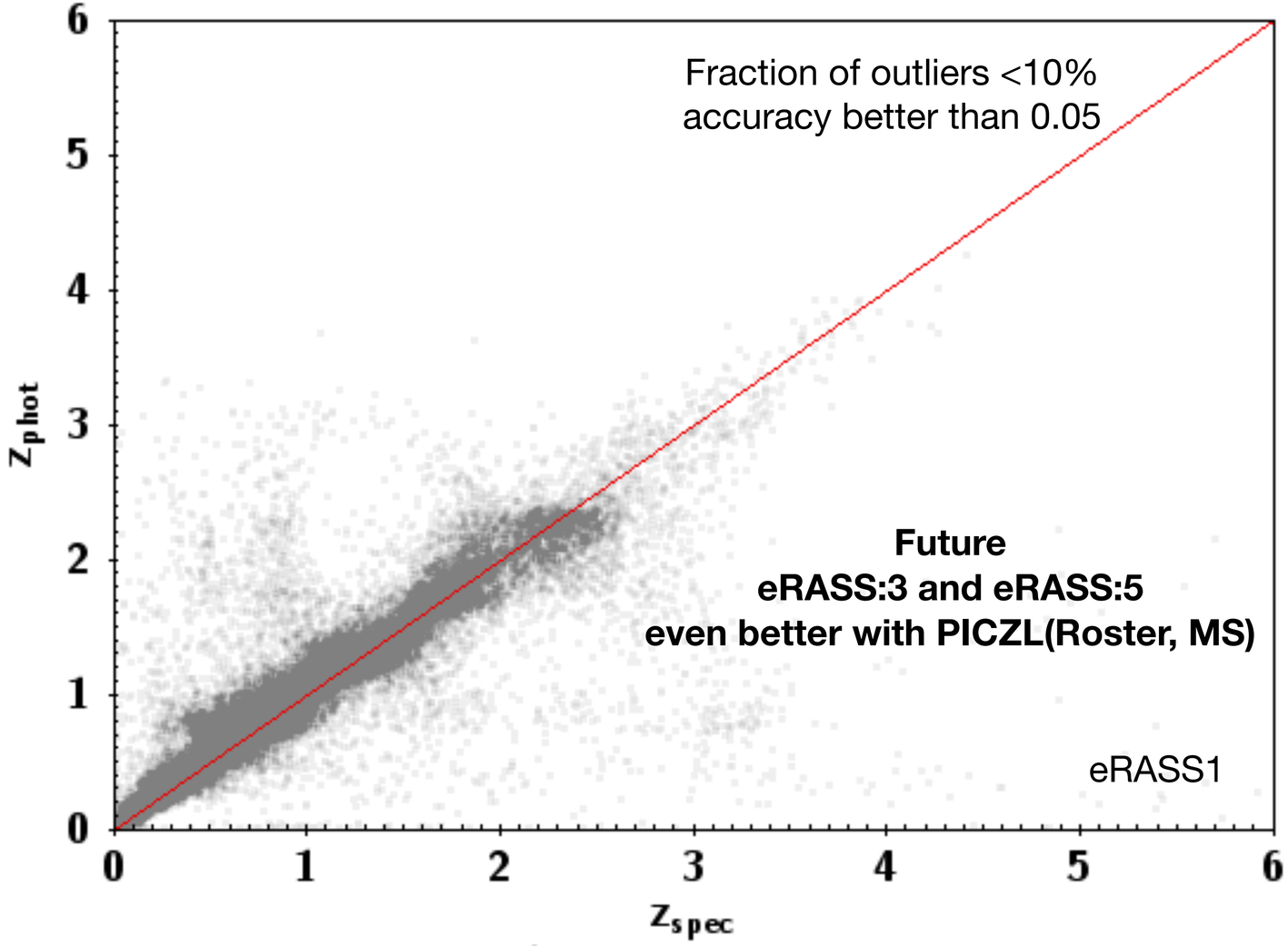
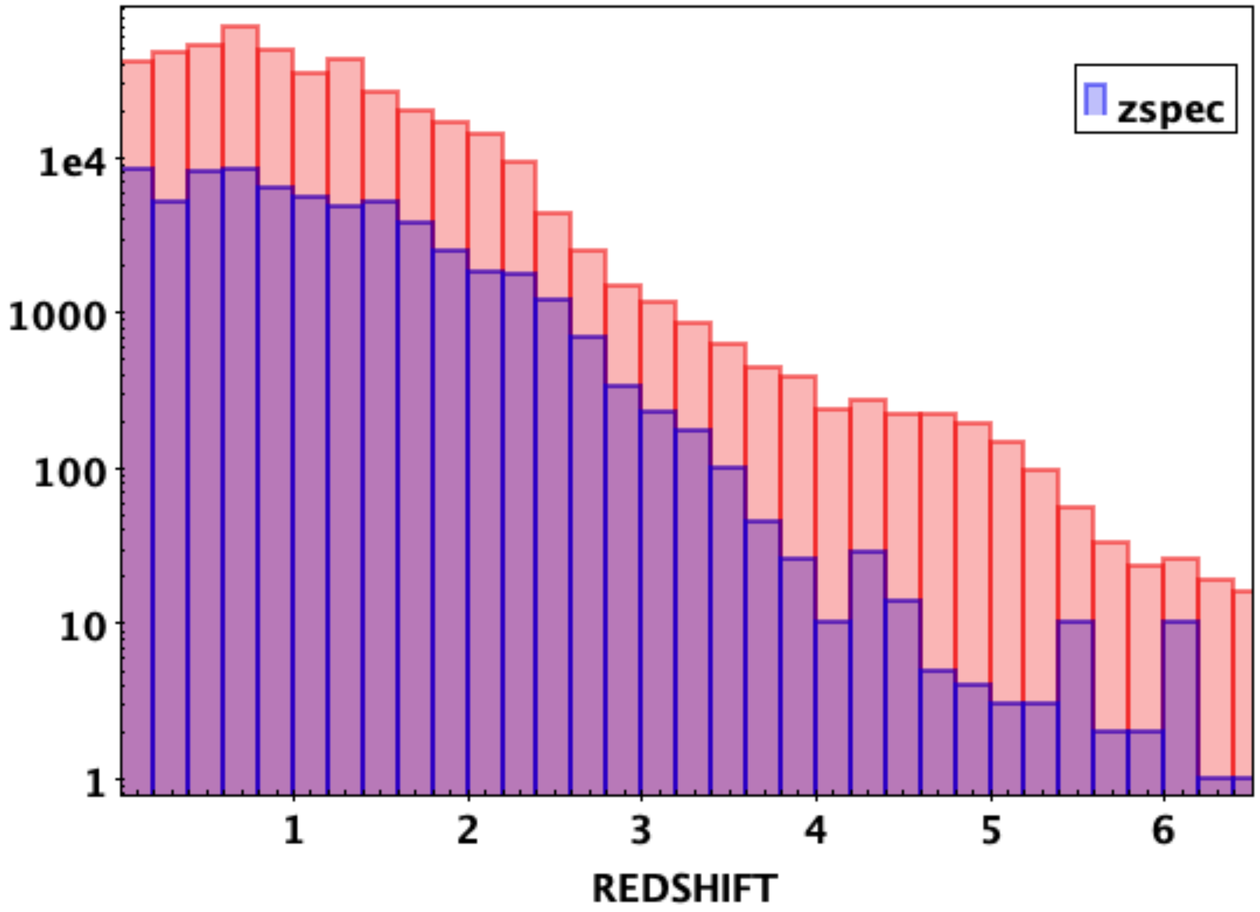
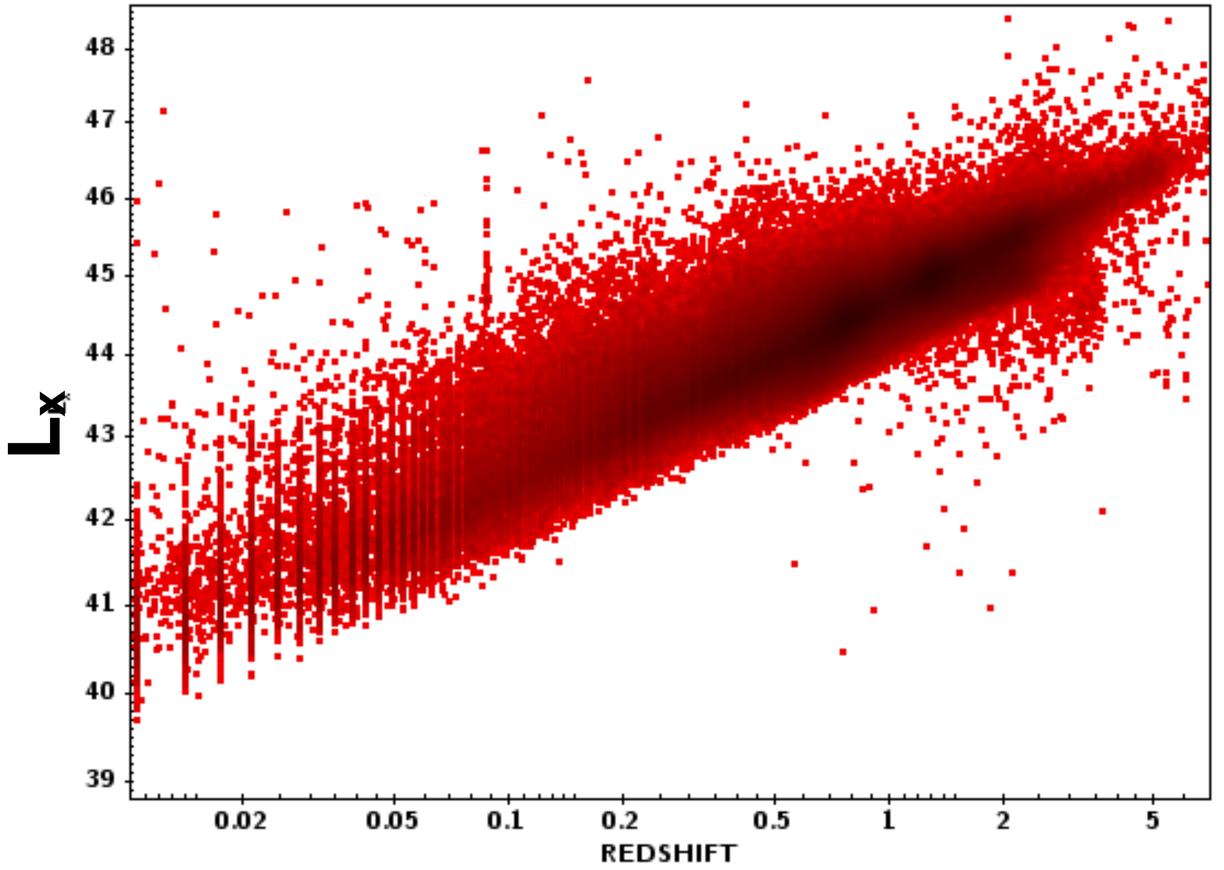




eRASS1/ redshift and luminosity distribution





~200k redshifts from literature, mostly Quaia in the plot

more to come fro,m SDSS-V, DESI, 4MOST

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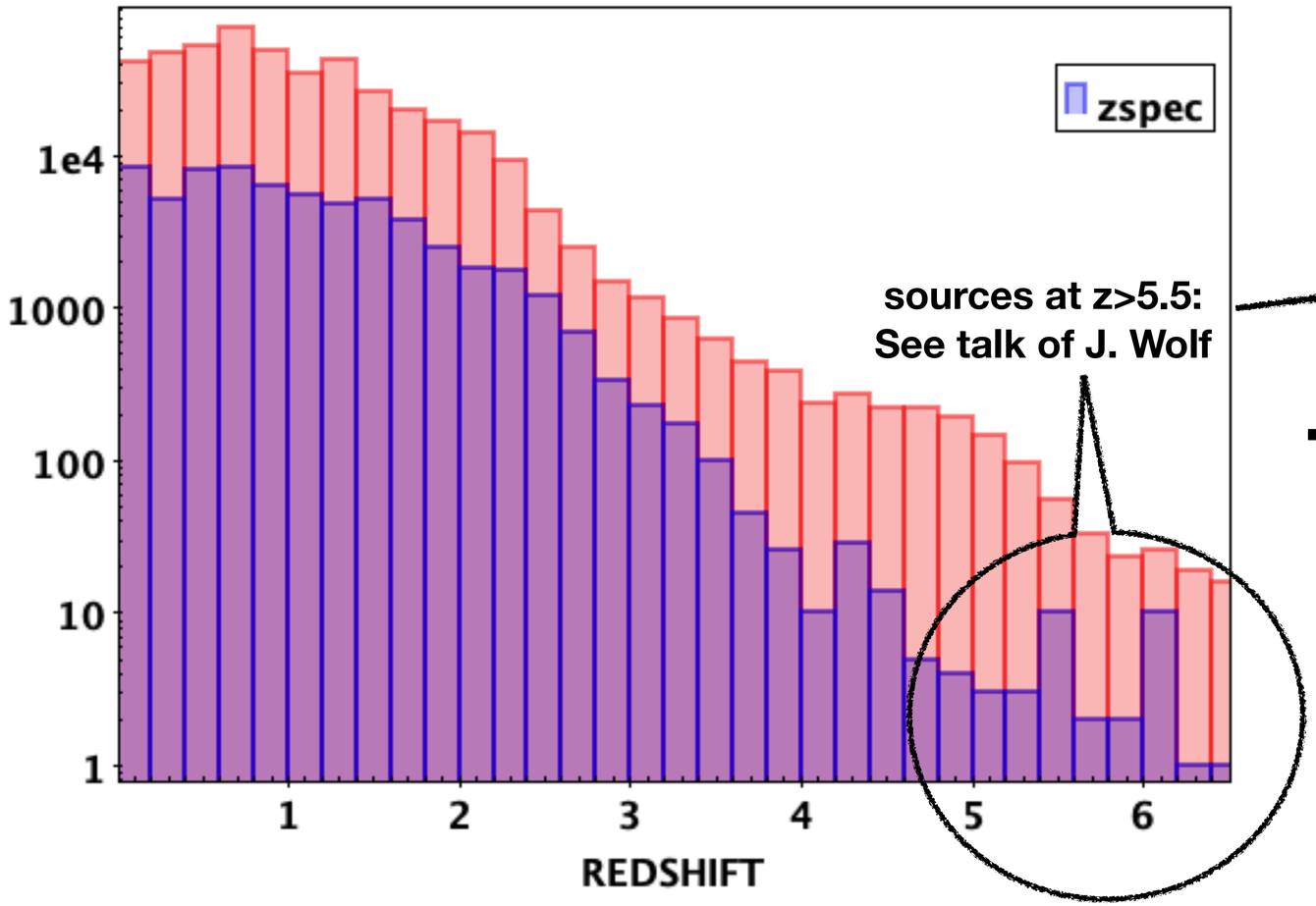

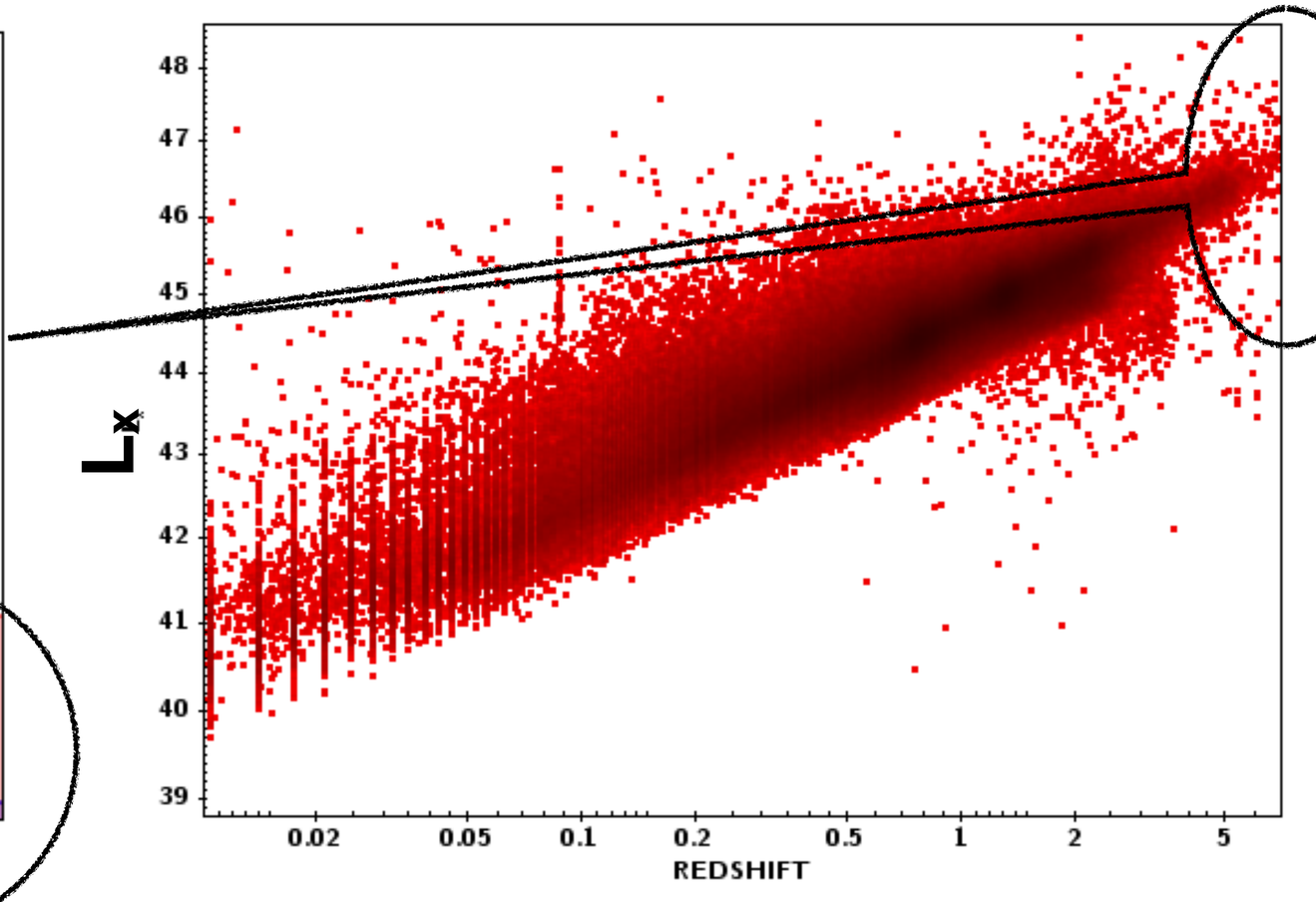

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eROSITA AGN surveys in contest

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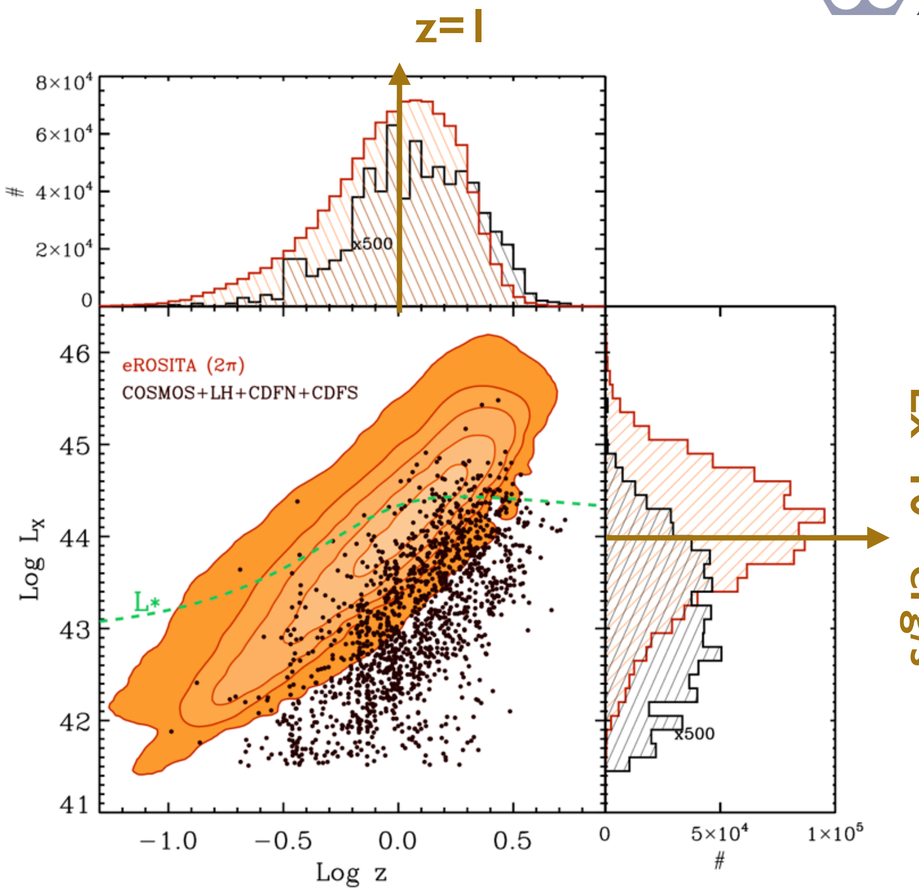

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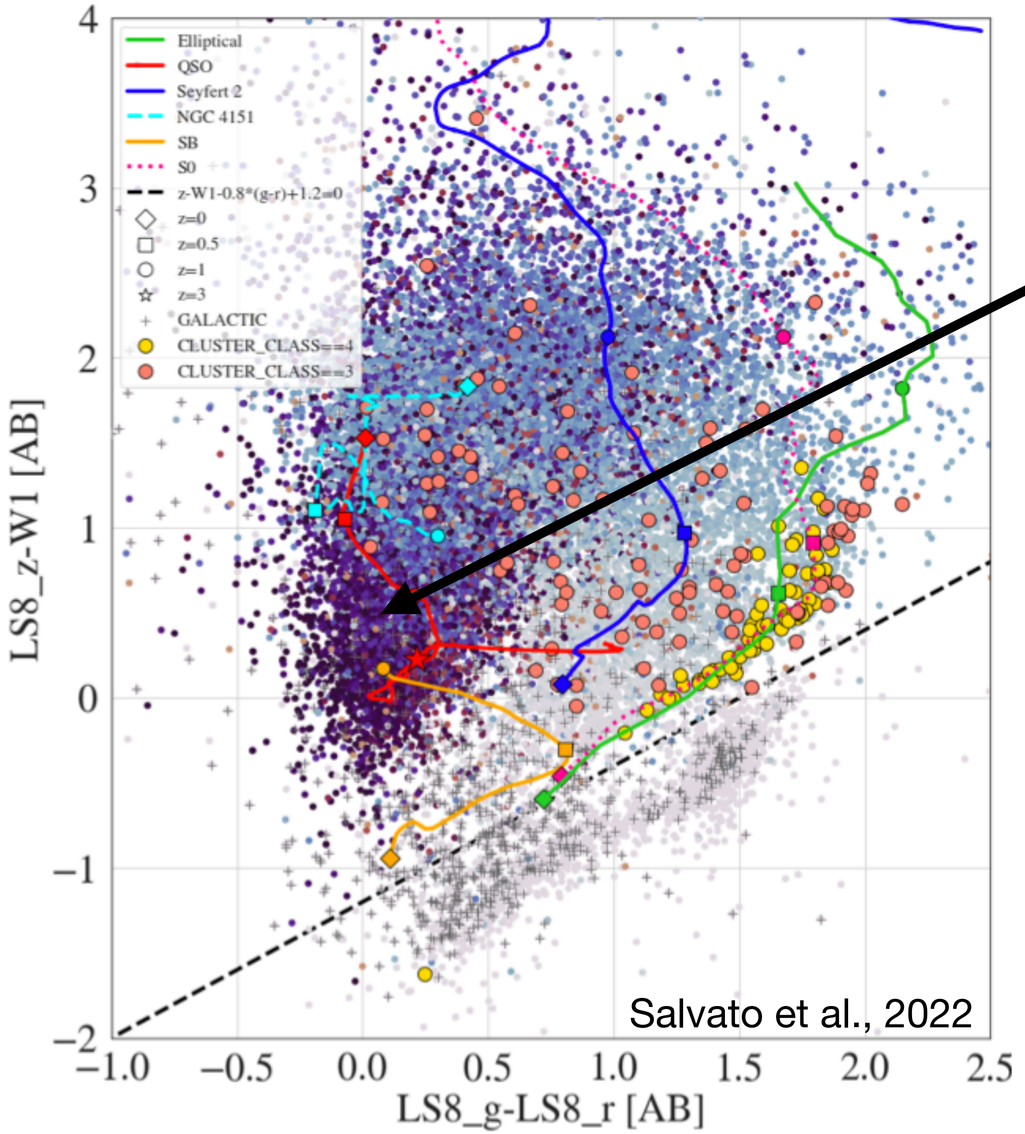
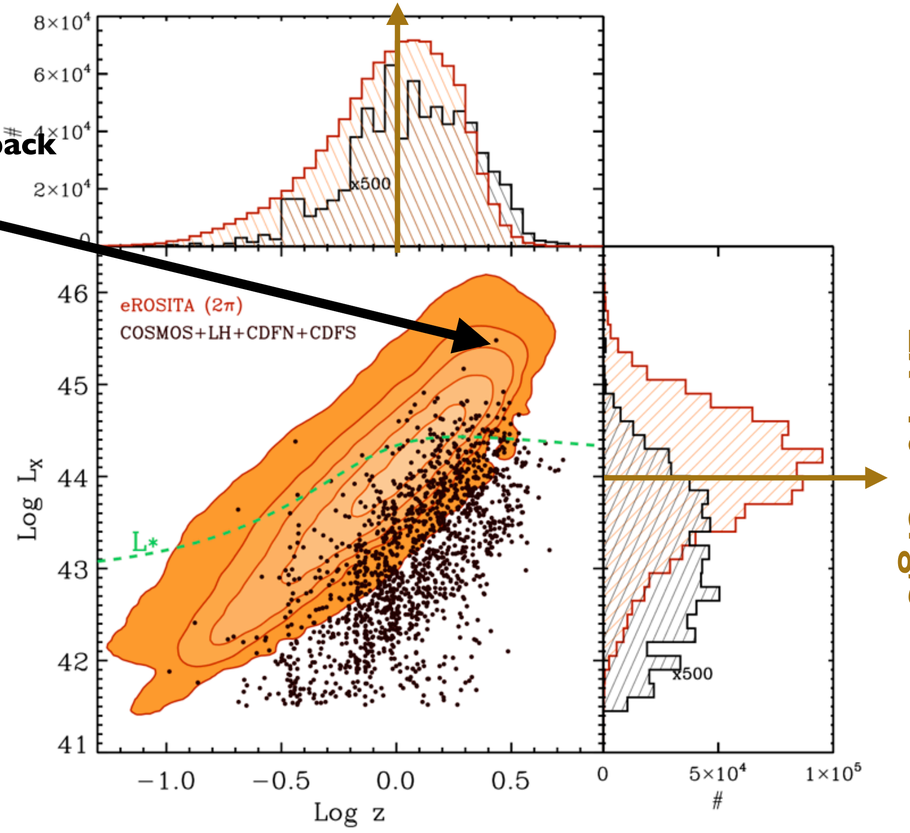


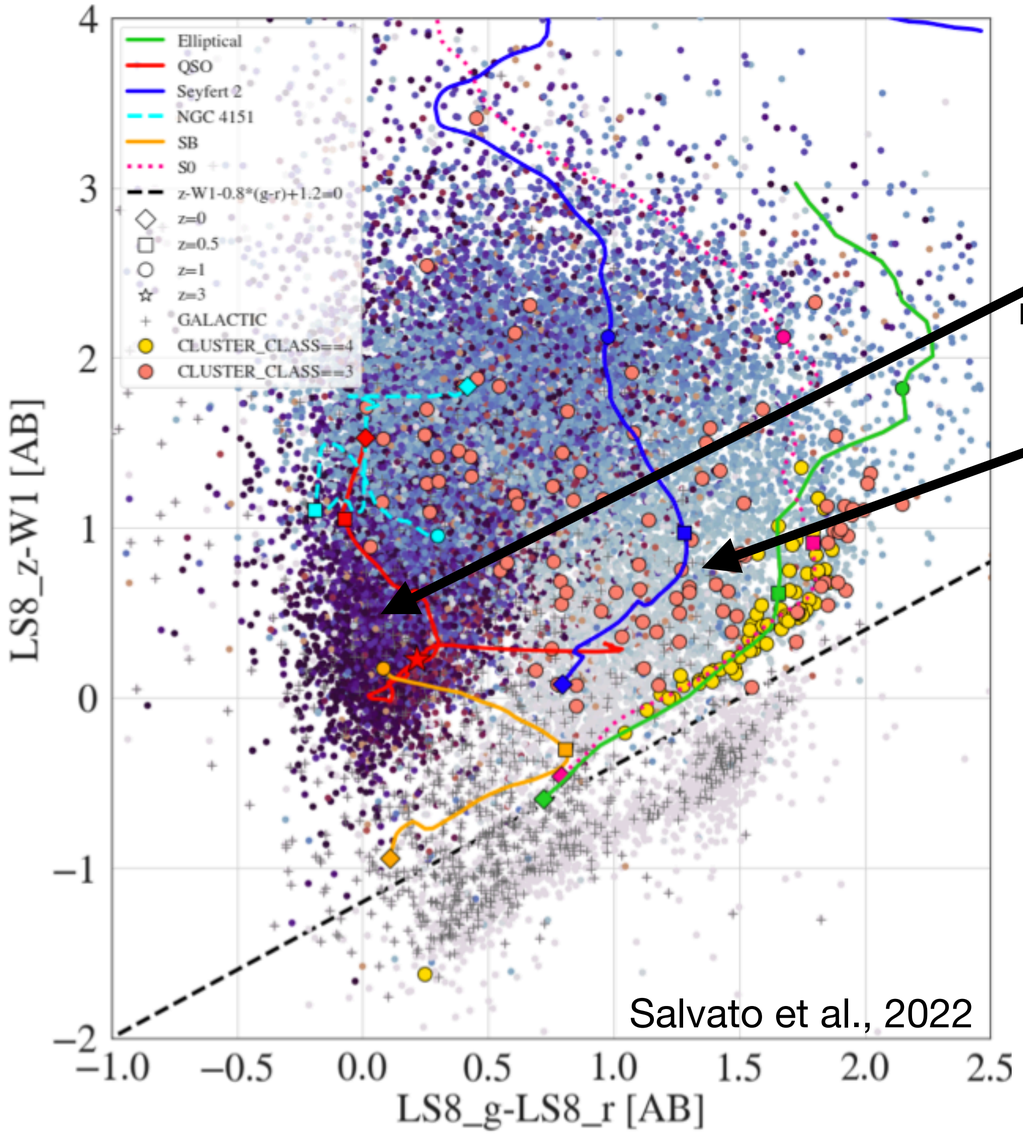
The most luminous AGN, tracers of large-scale structure: the "quasar" mode of AGN feedback

z=1



Lx=10^{44} erg/s

eROSITA AGN surveys in contest



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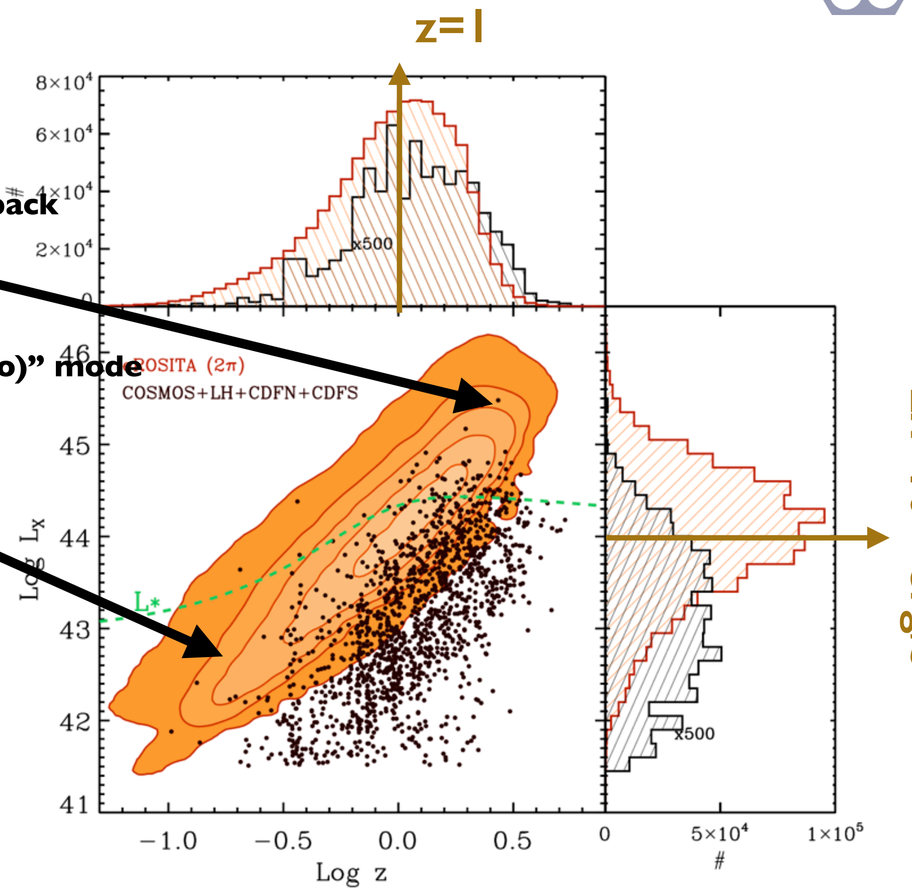
Nearby LLAGN: the "kinetic (radio)" mode of AGN feedback



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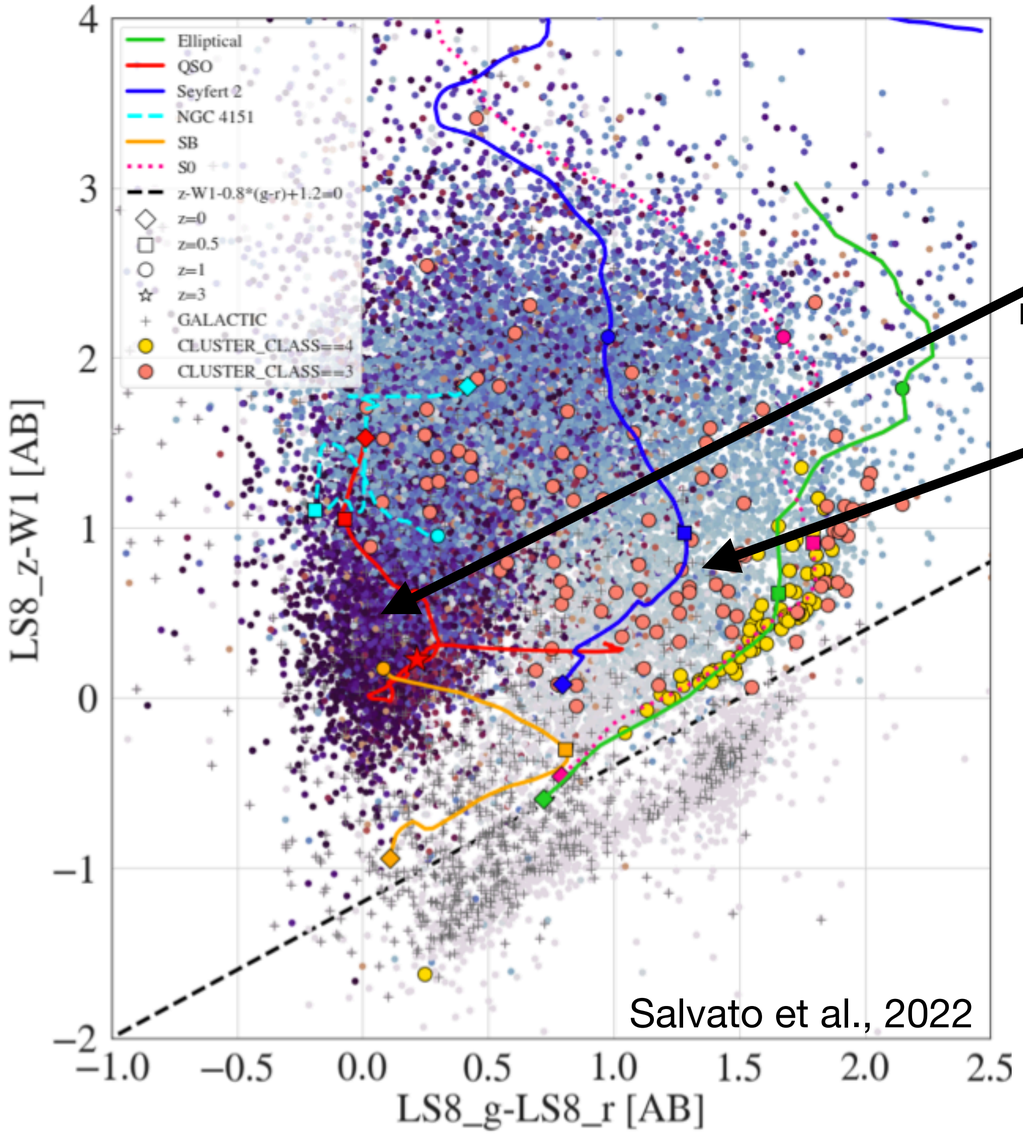

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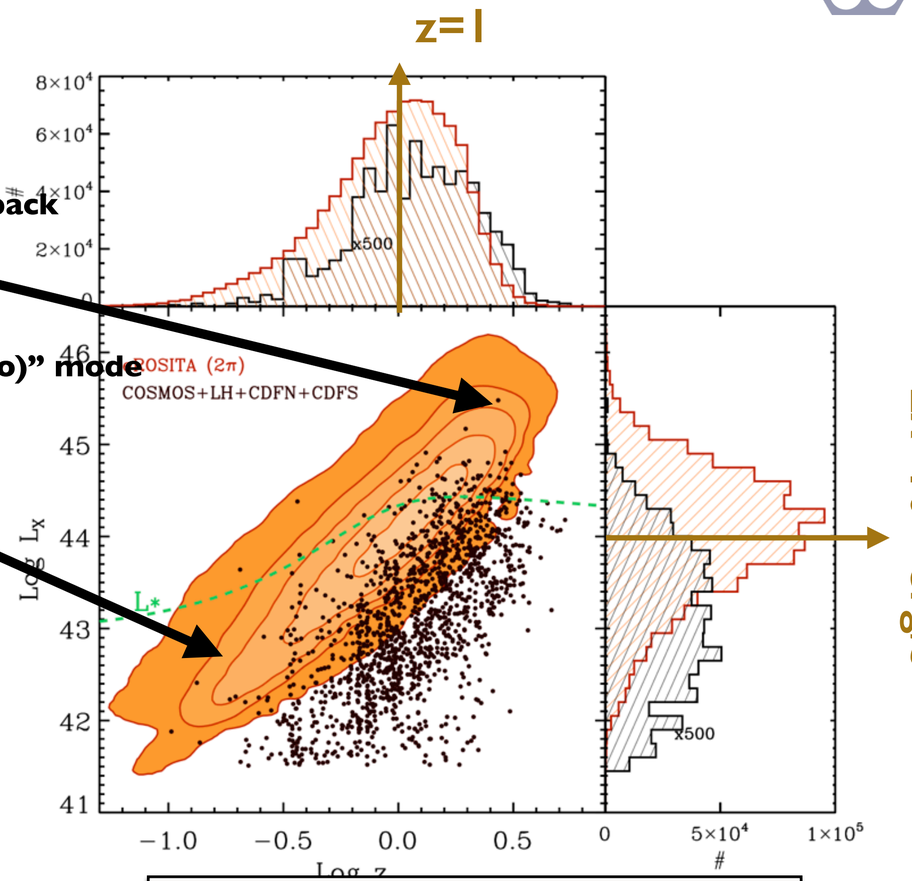
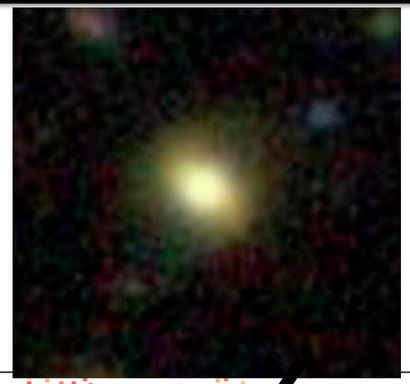
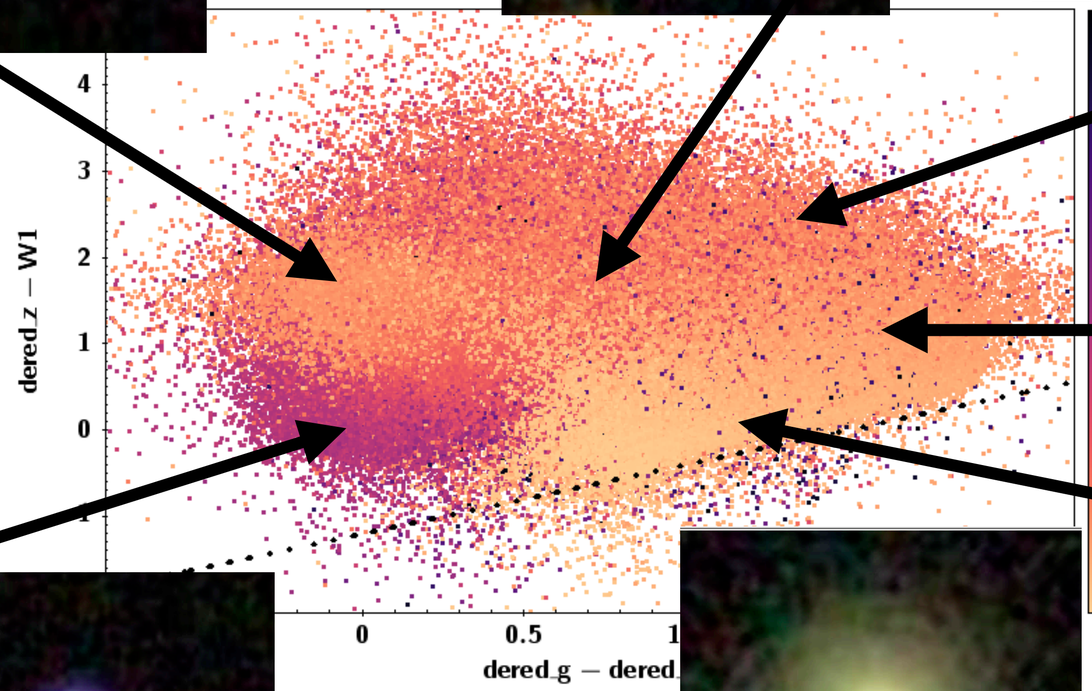
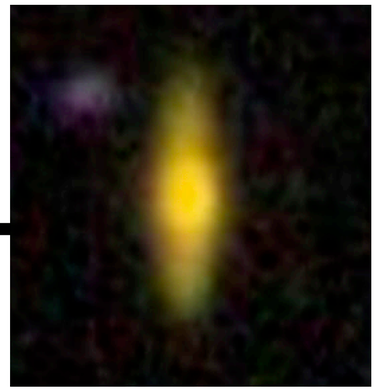


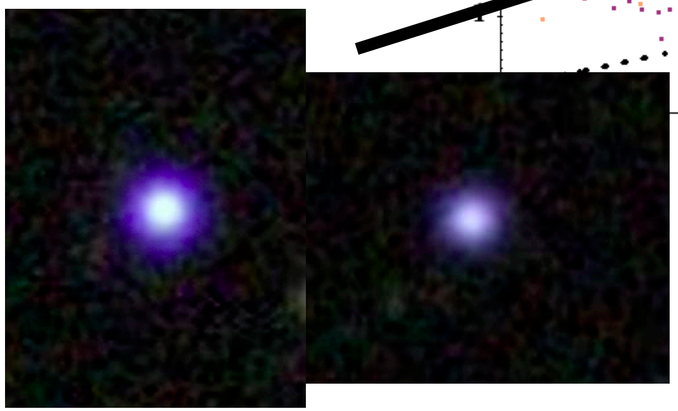
eROSITA will cover uniformly the redshift range 0<z<3
Ideal! Large samples available to study AGN at different L, z, N_H, M_*, SFR, Radio emission

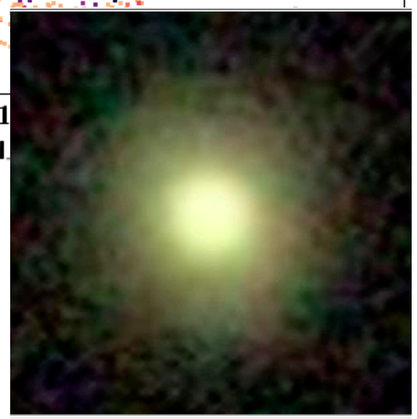
what AGN and where

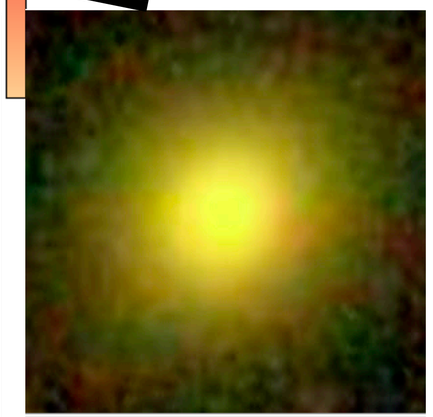


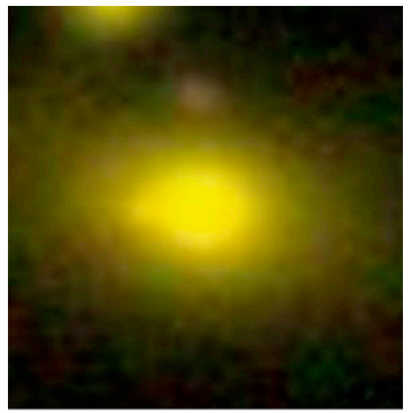




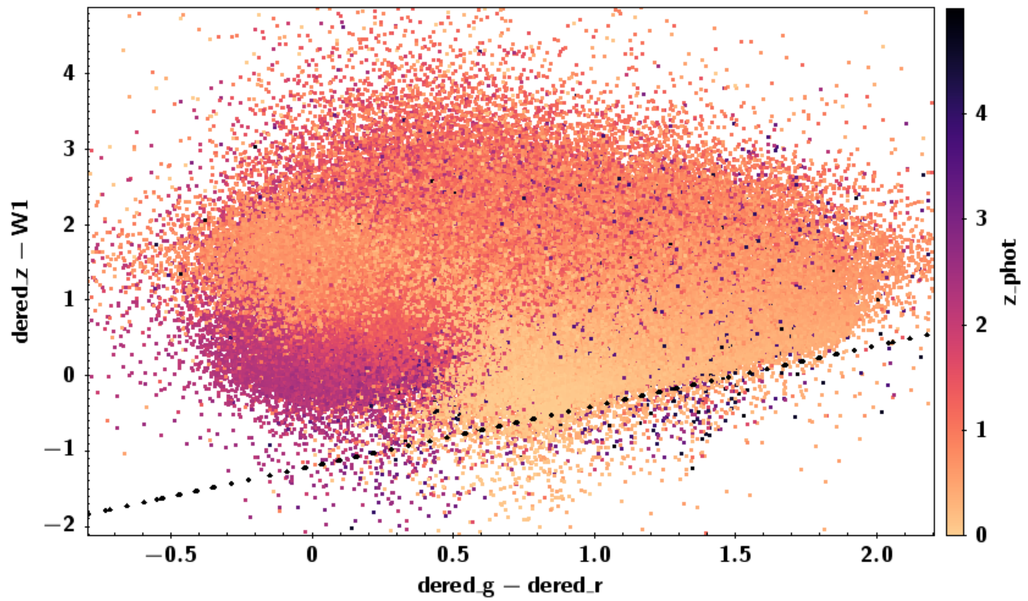


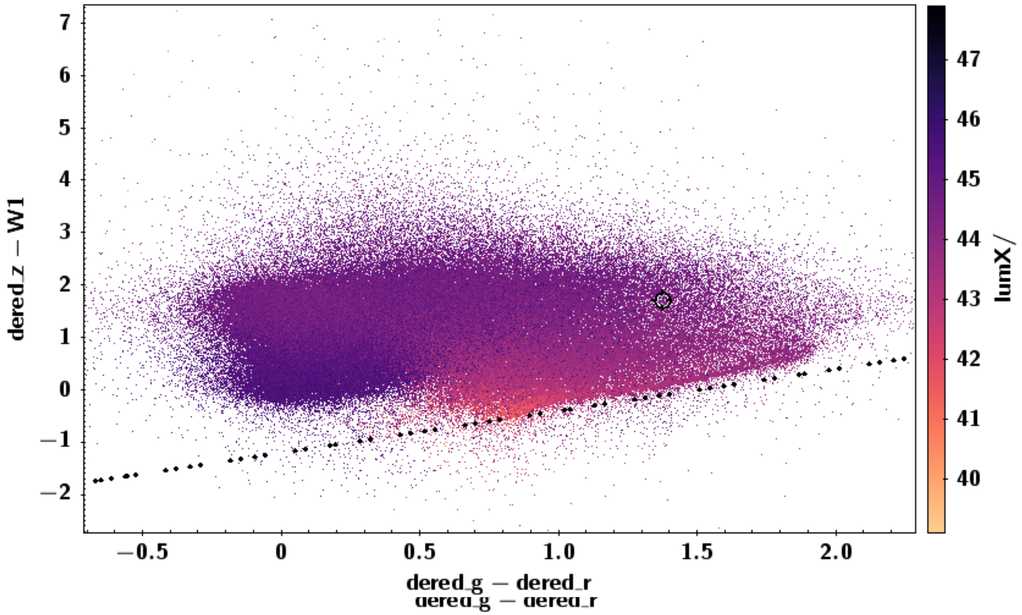






eRASS1 “shared” AGN (inAllLS10==1)





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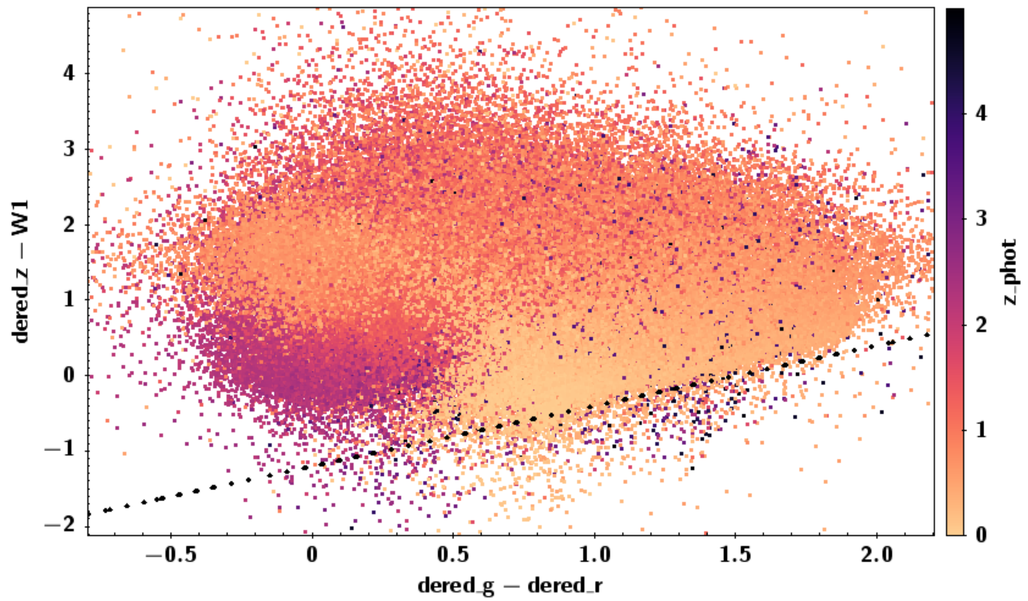

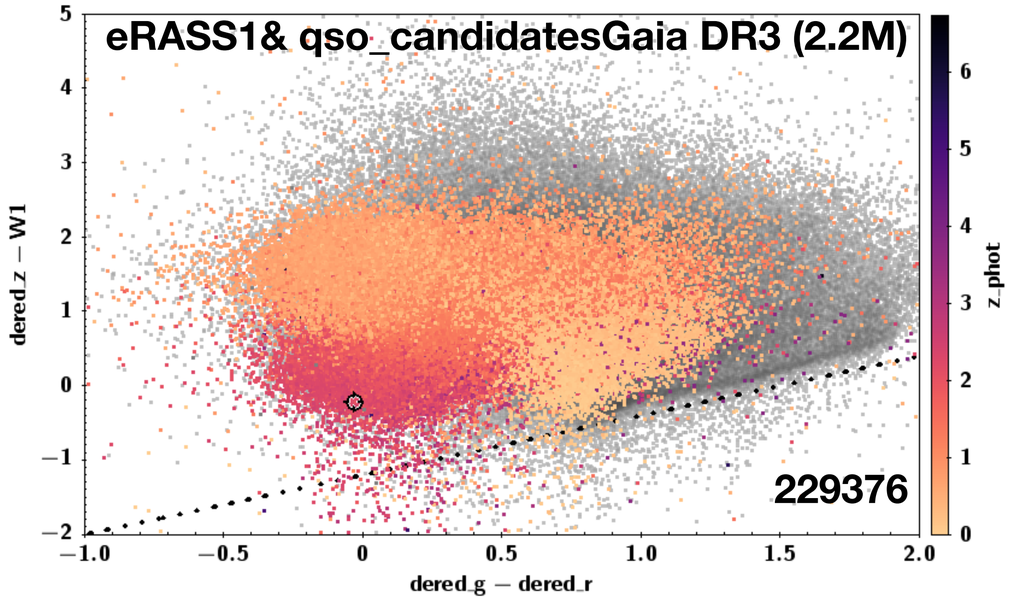

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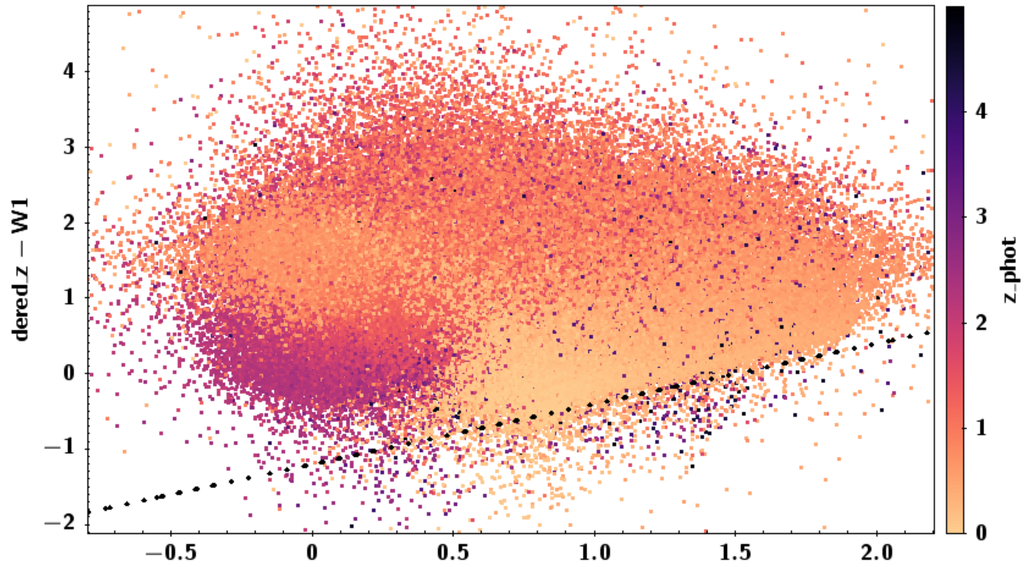
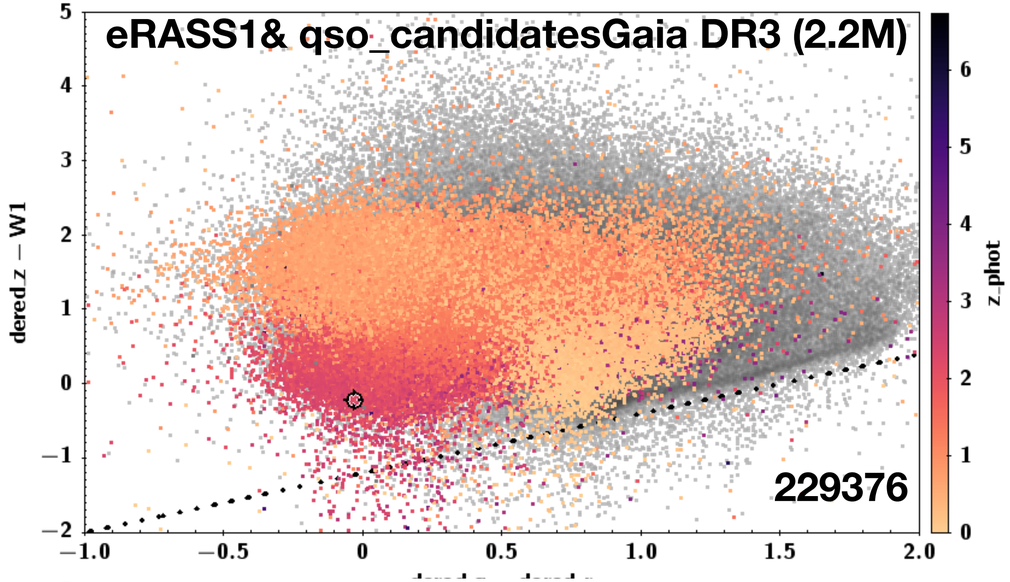
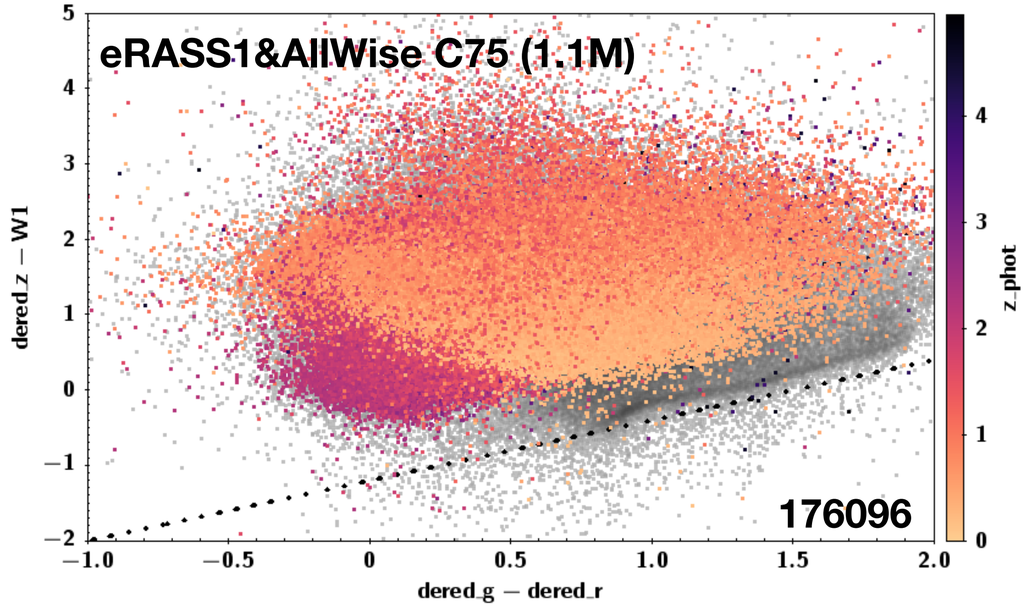
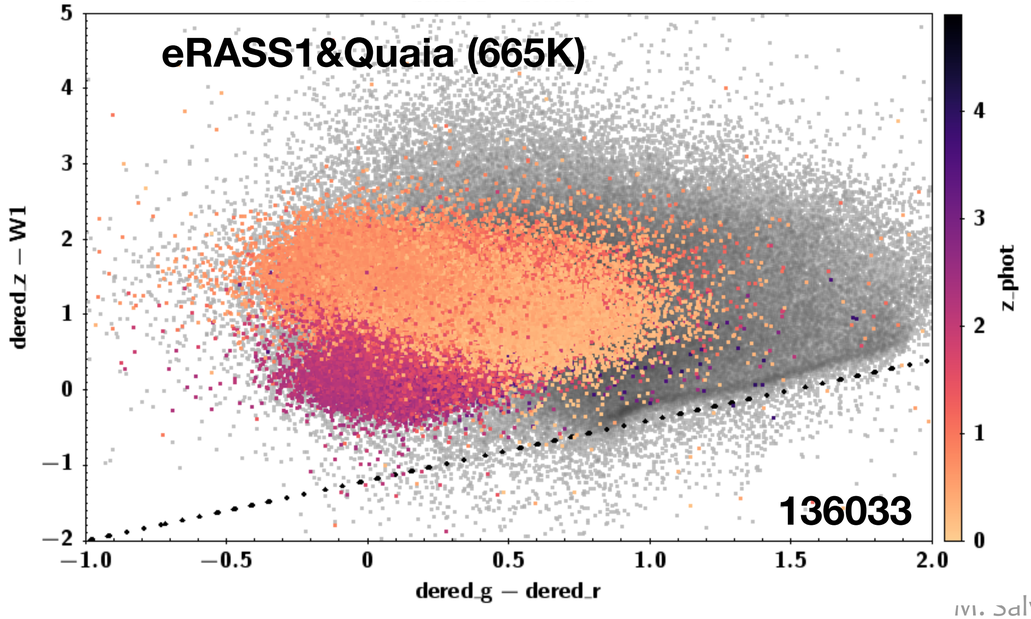
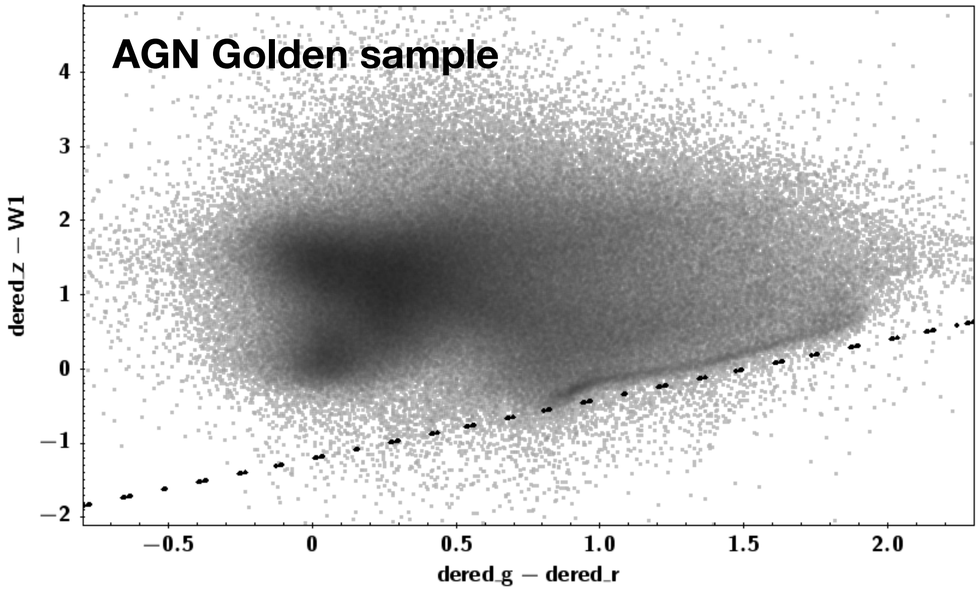


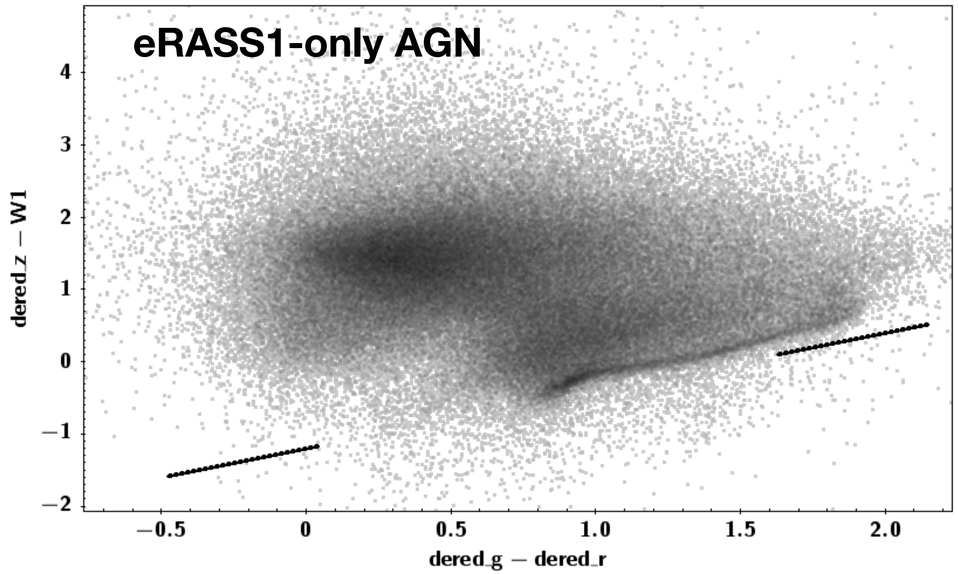


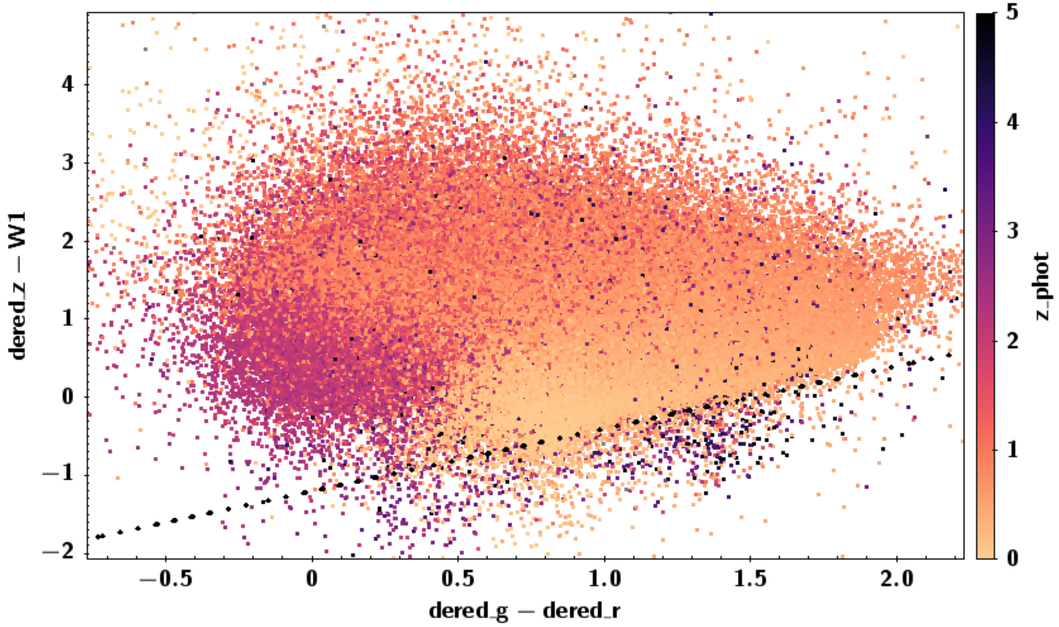


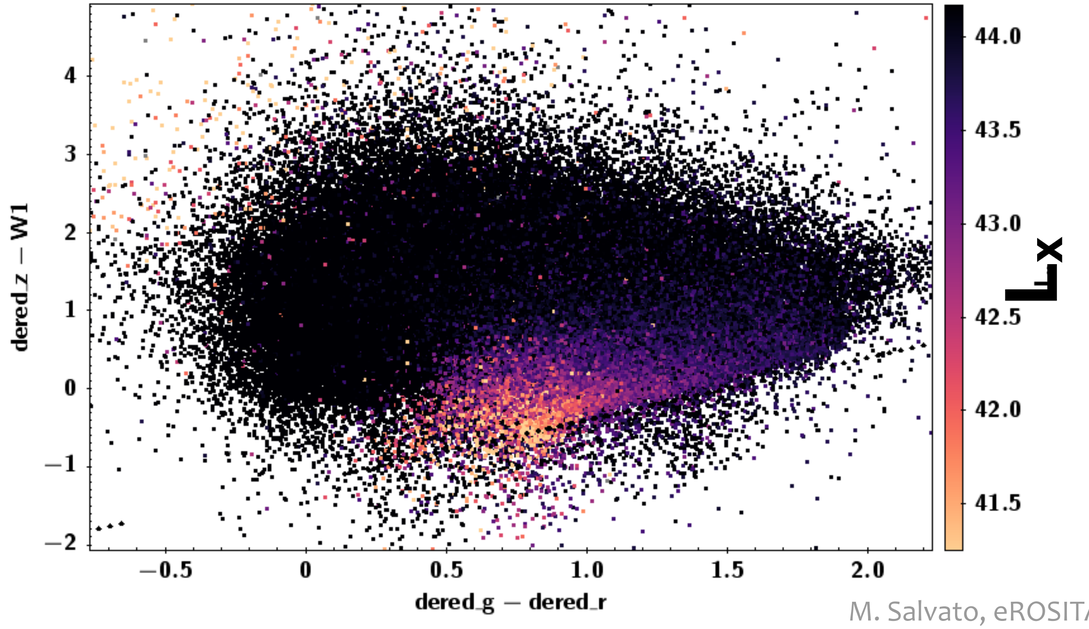


~50% of the AGN golden sample is not selected by other AGN surveys

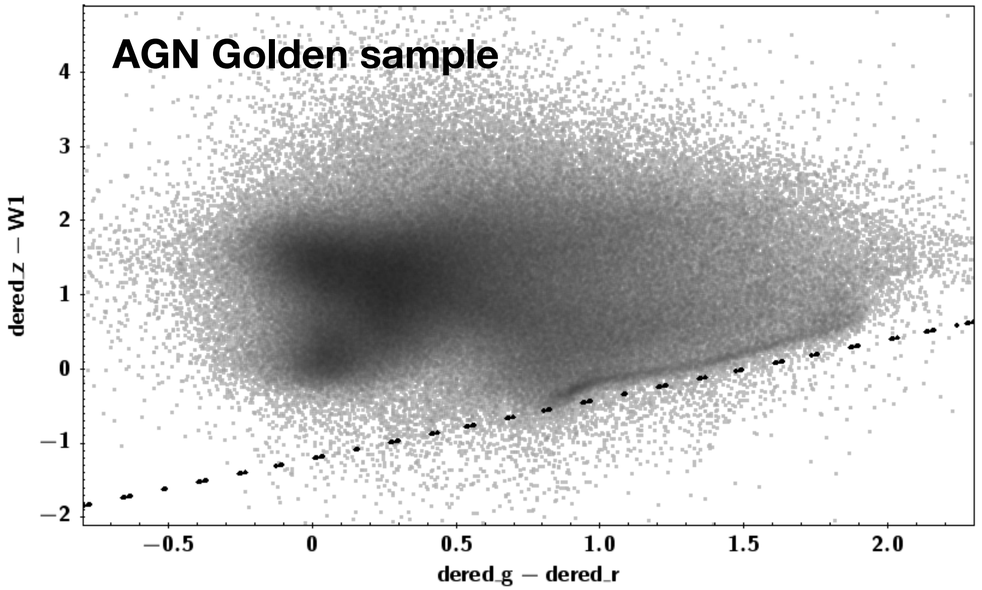


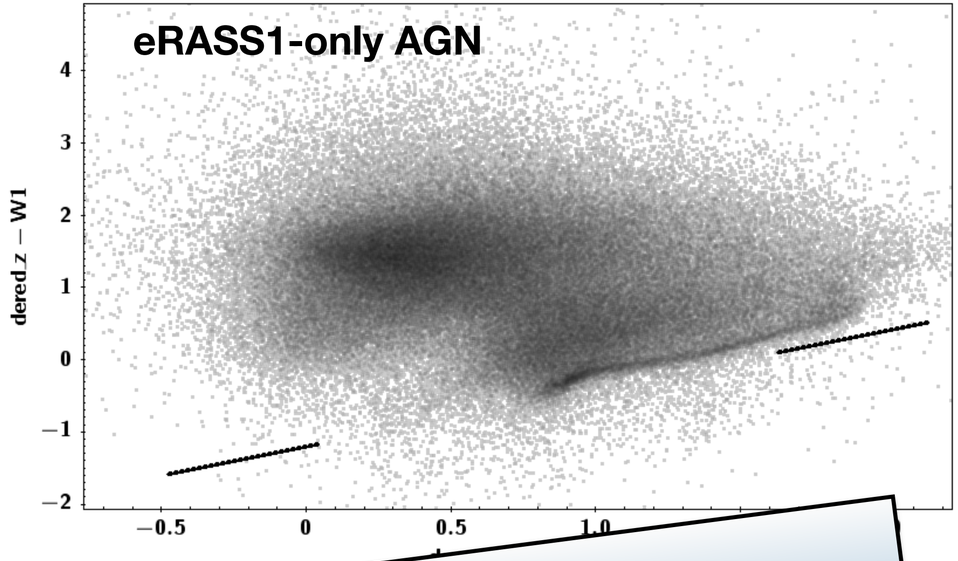




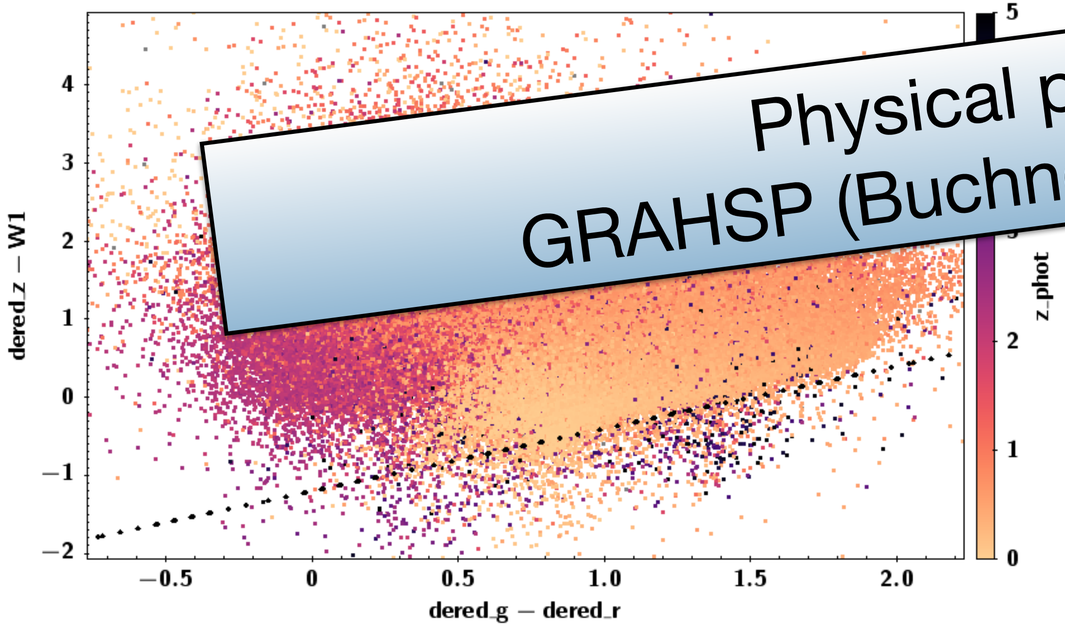


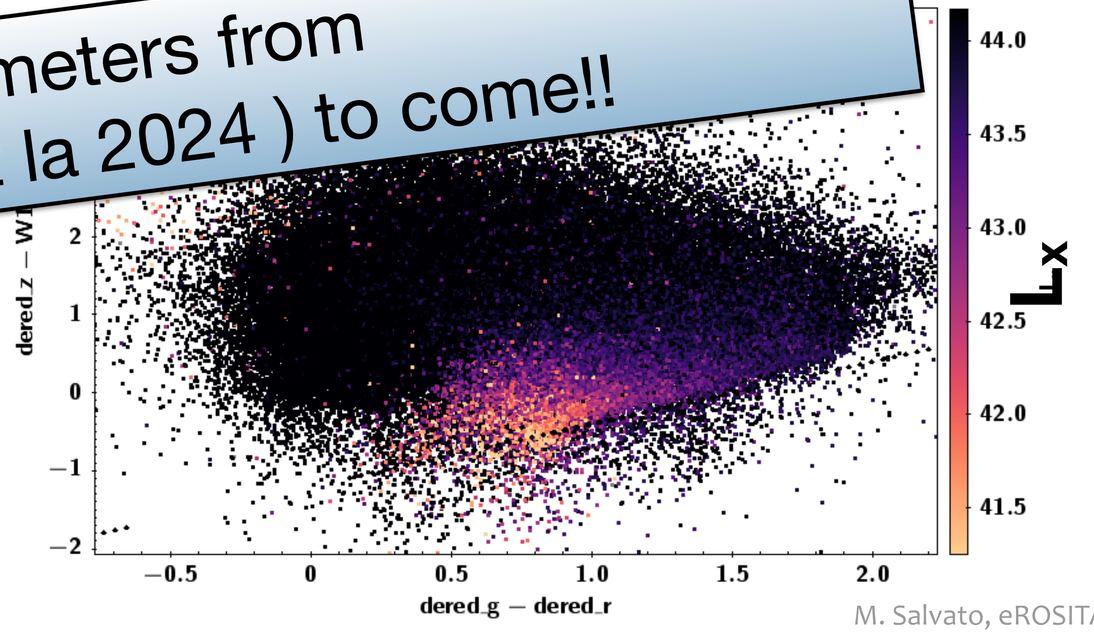
~50% of the AGN golden sample is not selected by other AGN surveys



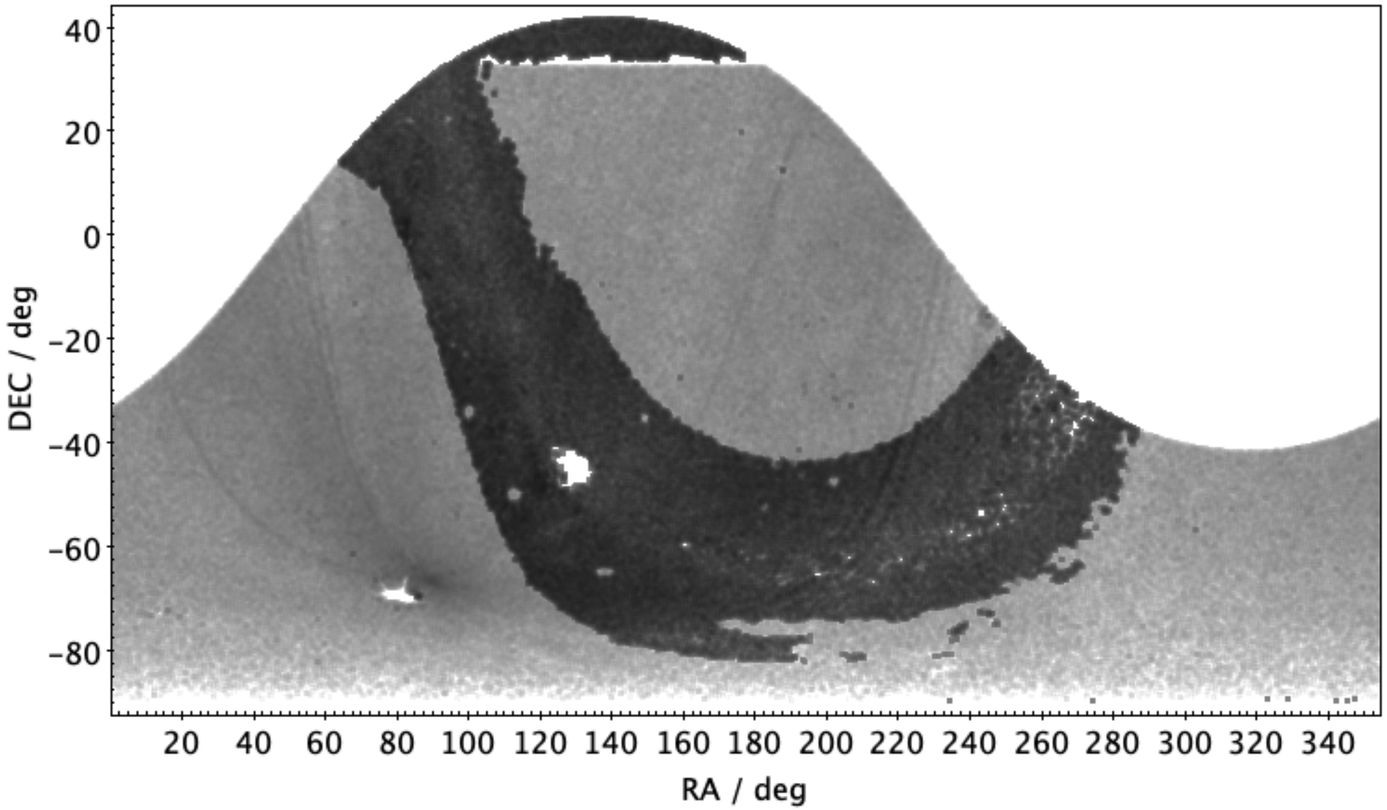


Physical parameters from GRAHSP (Buchner et la 2024) to come!!





eRASS1 AGN to be harvested also in the Galactic Plane



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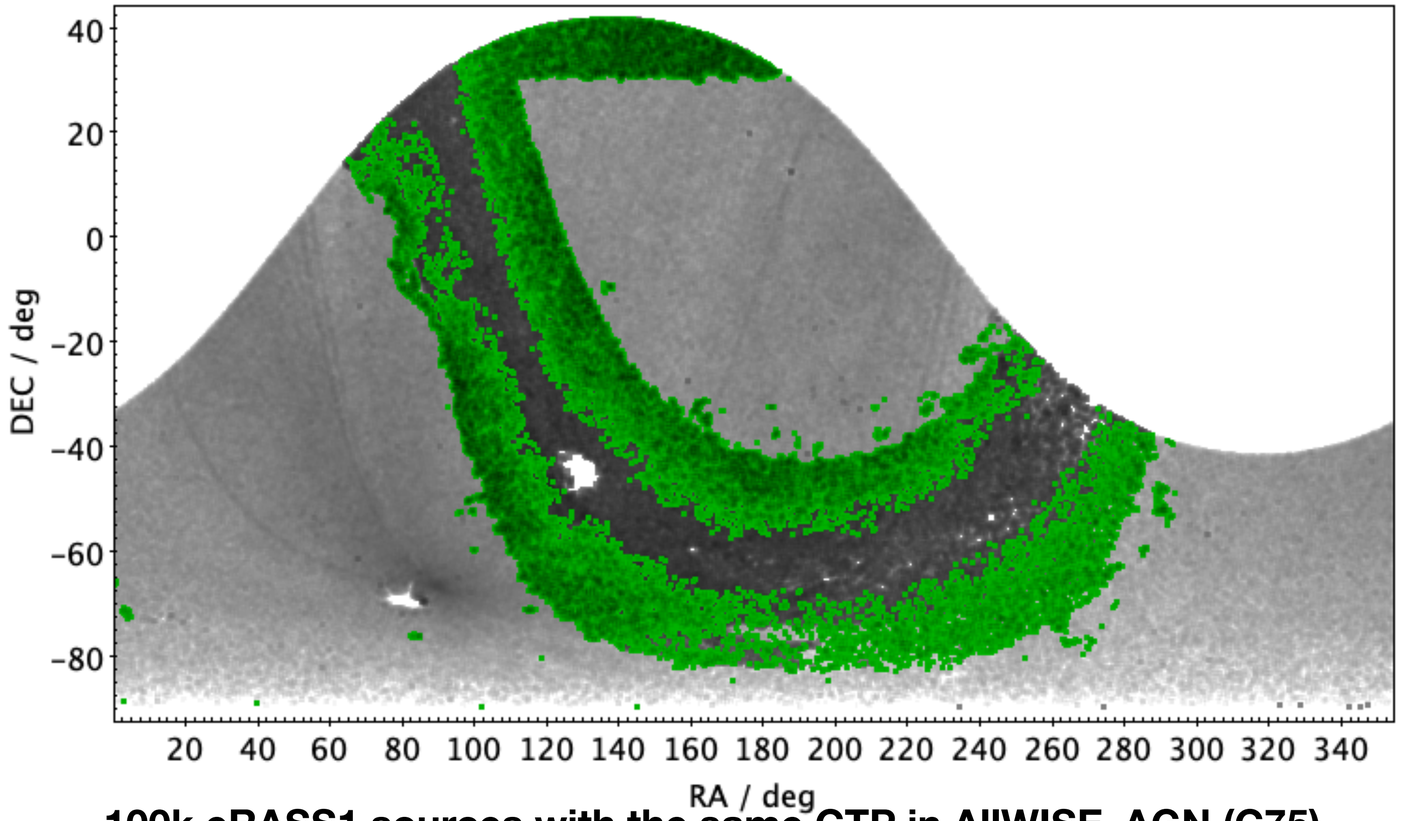

100k eRASS1 sources with the same CTP in AllWISE_AGN (C75) and qso_candidates from GDR3

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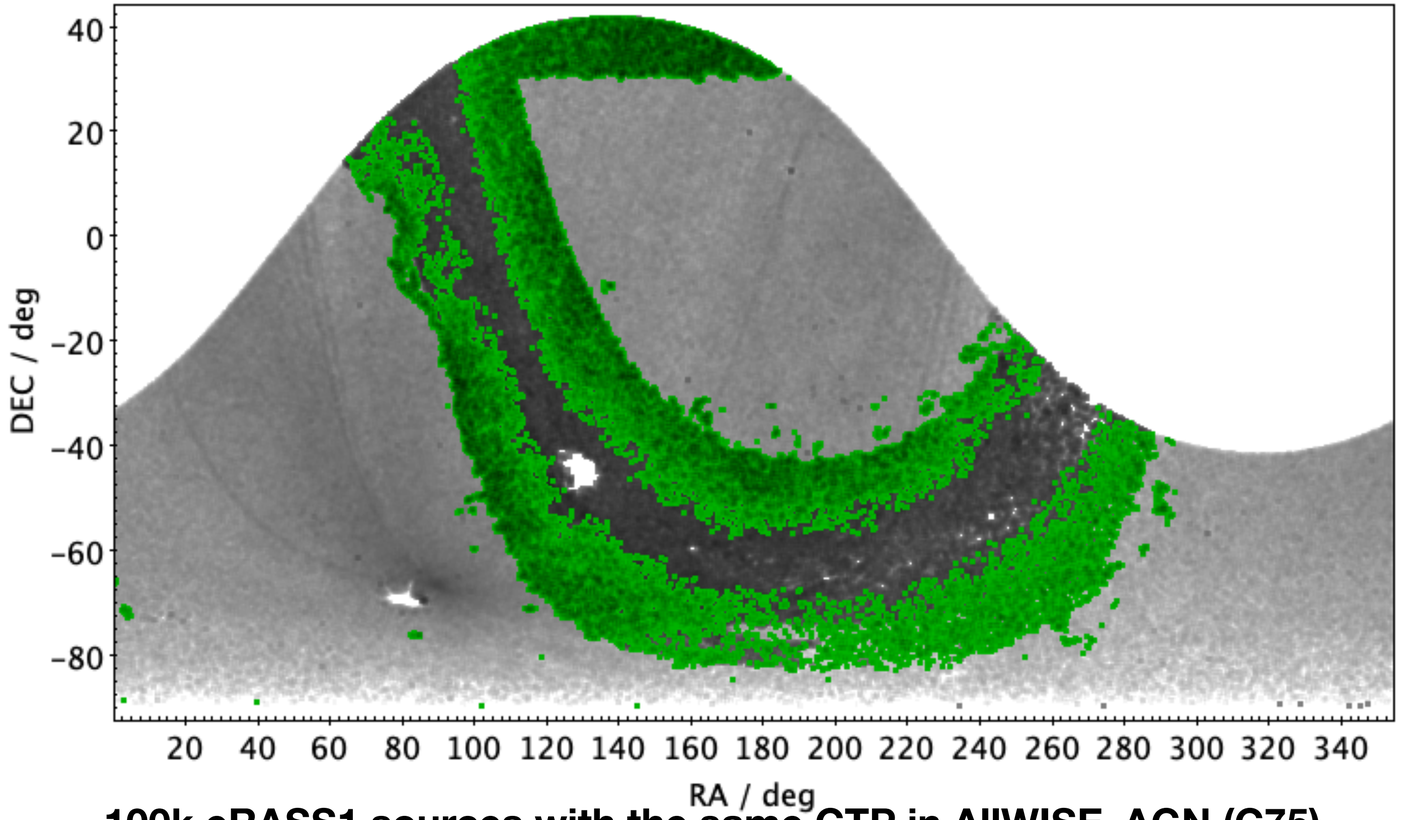

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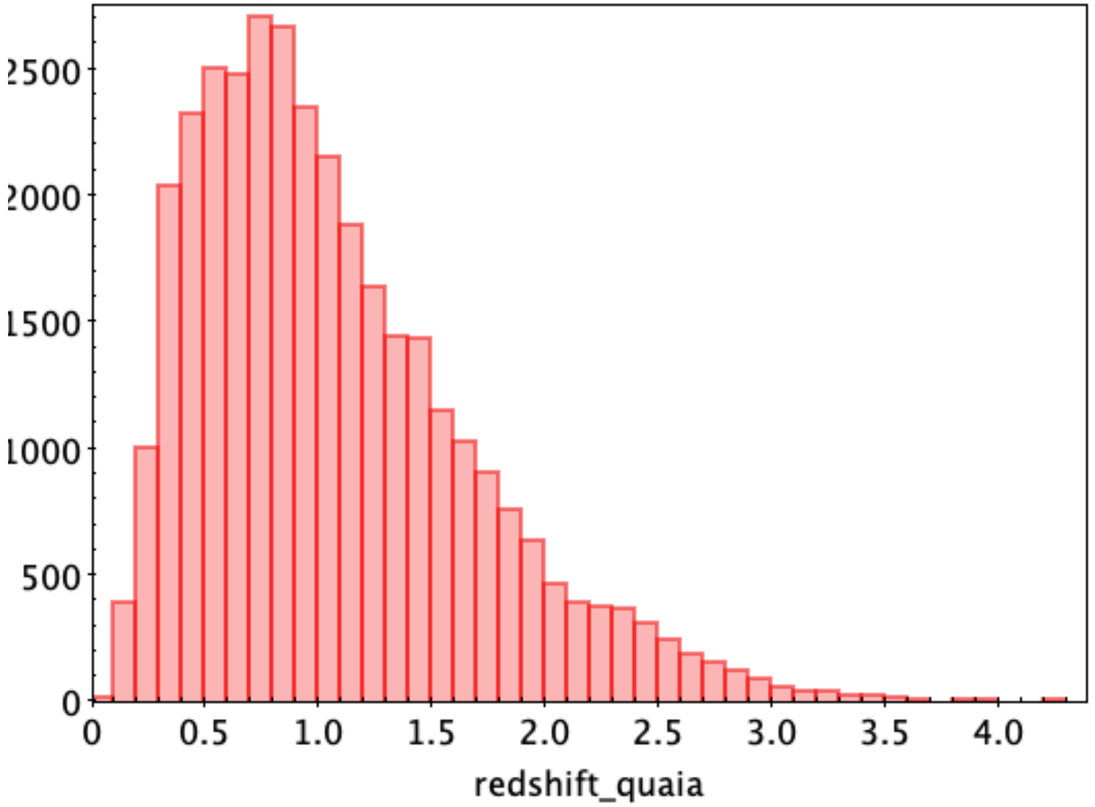


~36k AGN with redshift from Quaia

Summary

- about 900k point-sources in the eRASS1 main catalog are AGN

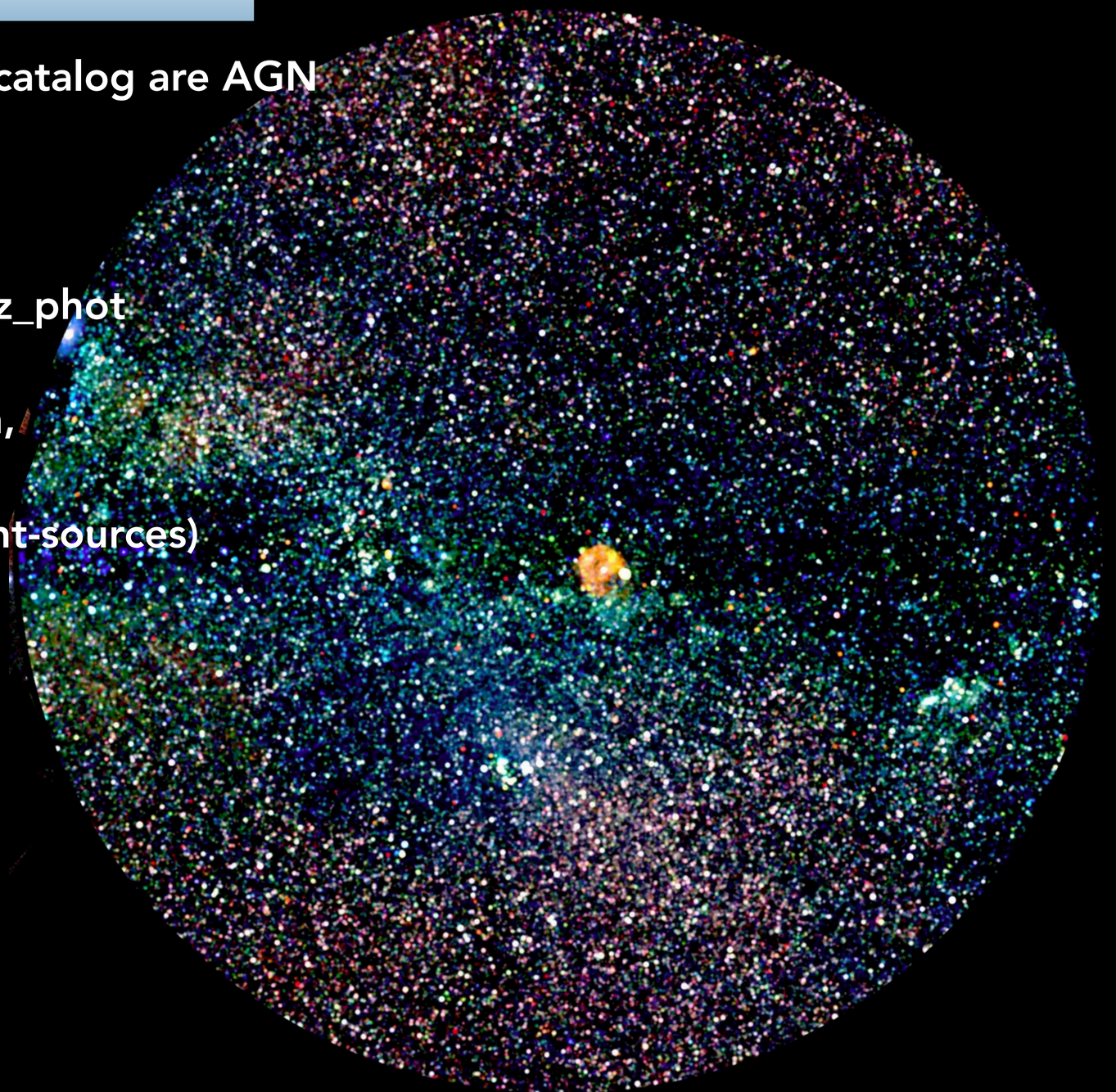
- 750k sources are on the footprint of LS10

- 550k are AGN with excellent photometry and z_phot

- about 50% are new AGN non classified as such,
by AllWise or Gaia or Quaia
(but AllWISE is shallow and Gaia sees mostly point-sources)

- Additional ~100k are AGN classified as such
also by Allwise and Gaia in the Galactic plane
(36K with zspec)

- Catalogues are ready and we are finalisizing
the paper (Current goal is end of October)



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