WHAT ARE THE HOST GALAXIES OF MIR-SELECTED AGN?

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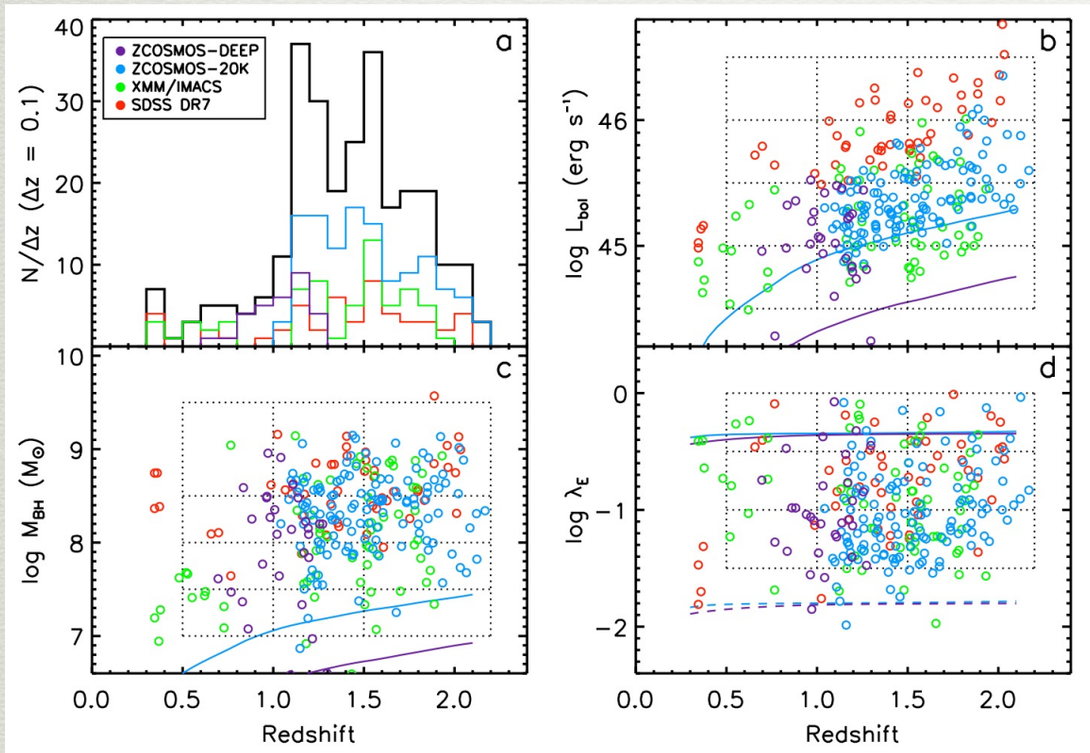
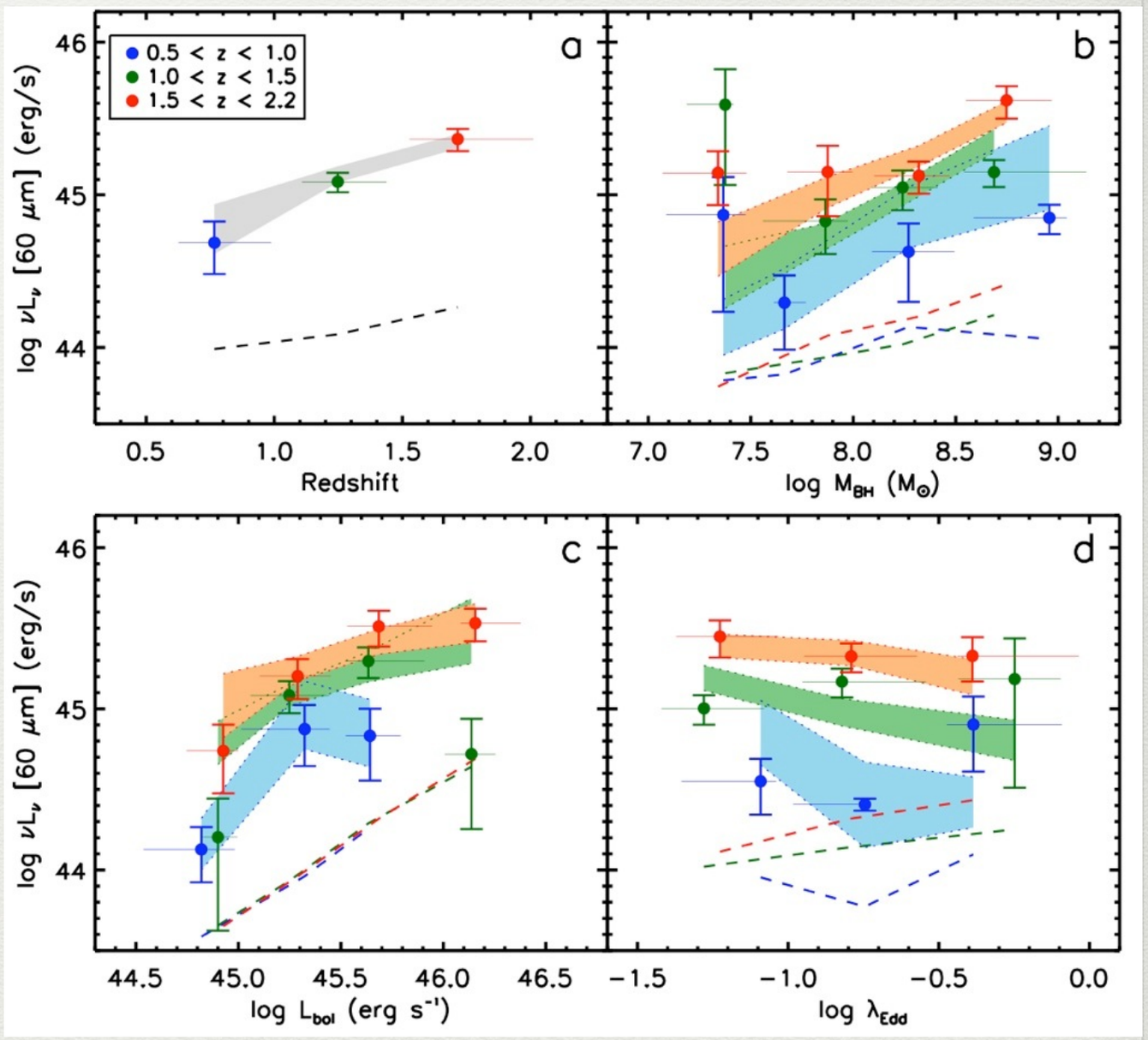
Contributions from Jenn Donley, Mara Salvato, Paola Santini, Dieter Lutz,
Francesca Civano, Marcella Brusa
PEP & COSMOS consortia

What are the host galaxies of unobscured QSOs?

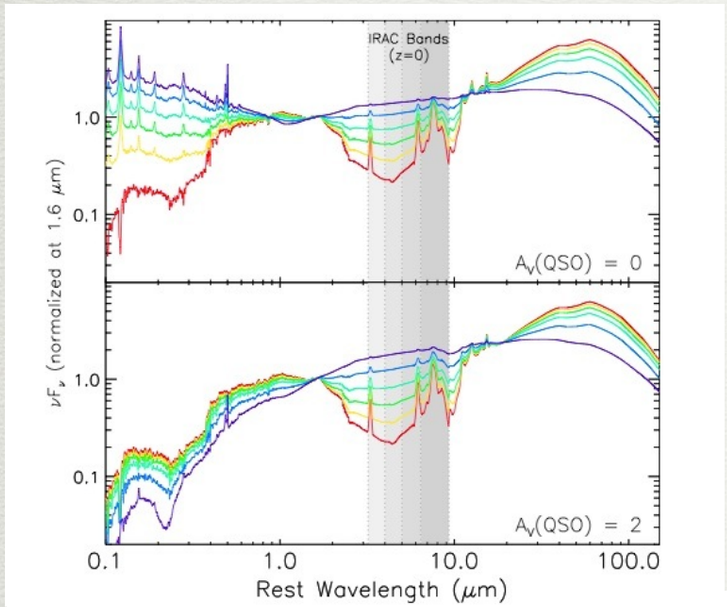




Modestly luminous unobscured AGN have SFRs that are consistent with their hosts lying mostly in normal, star-forming galaxies.

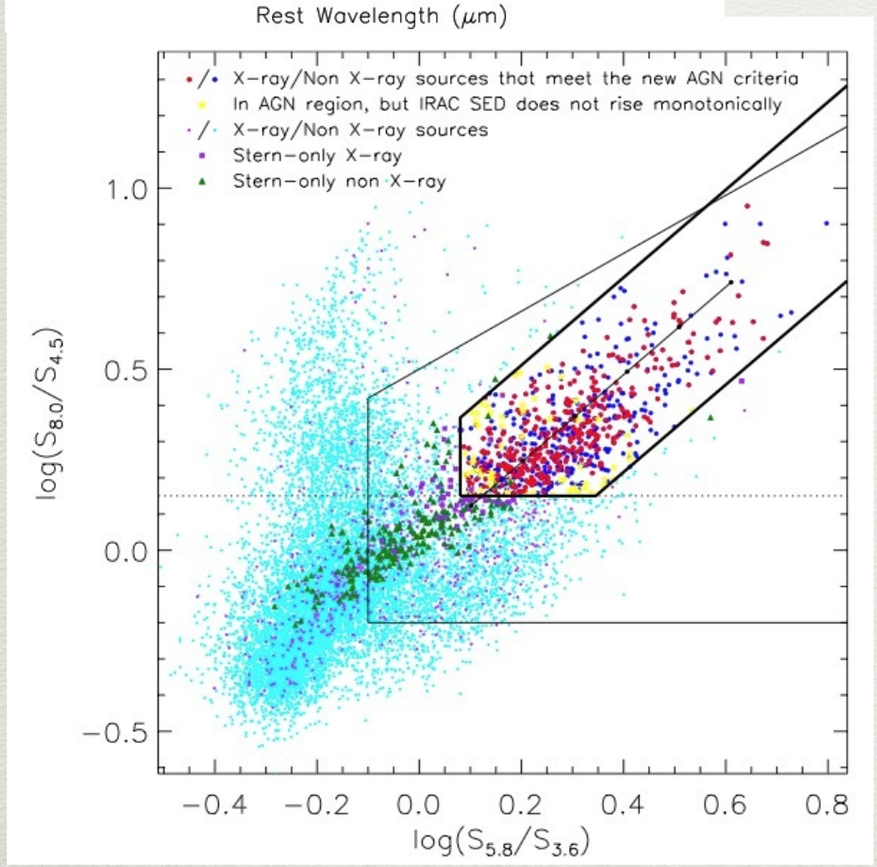
Rosario+ (2013c)

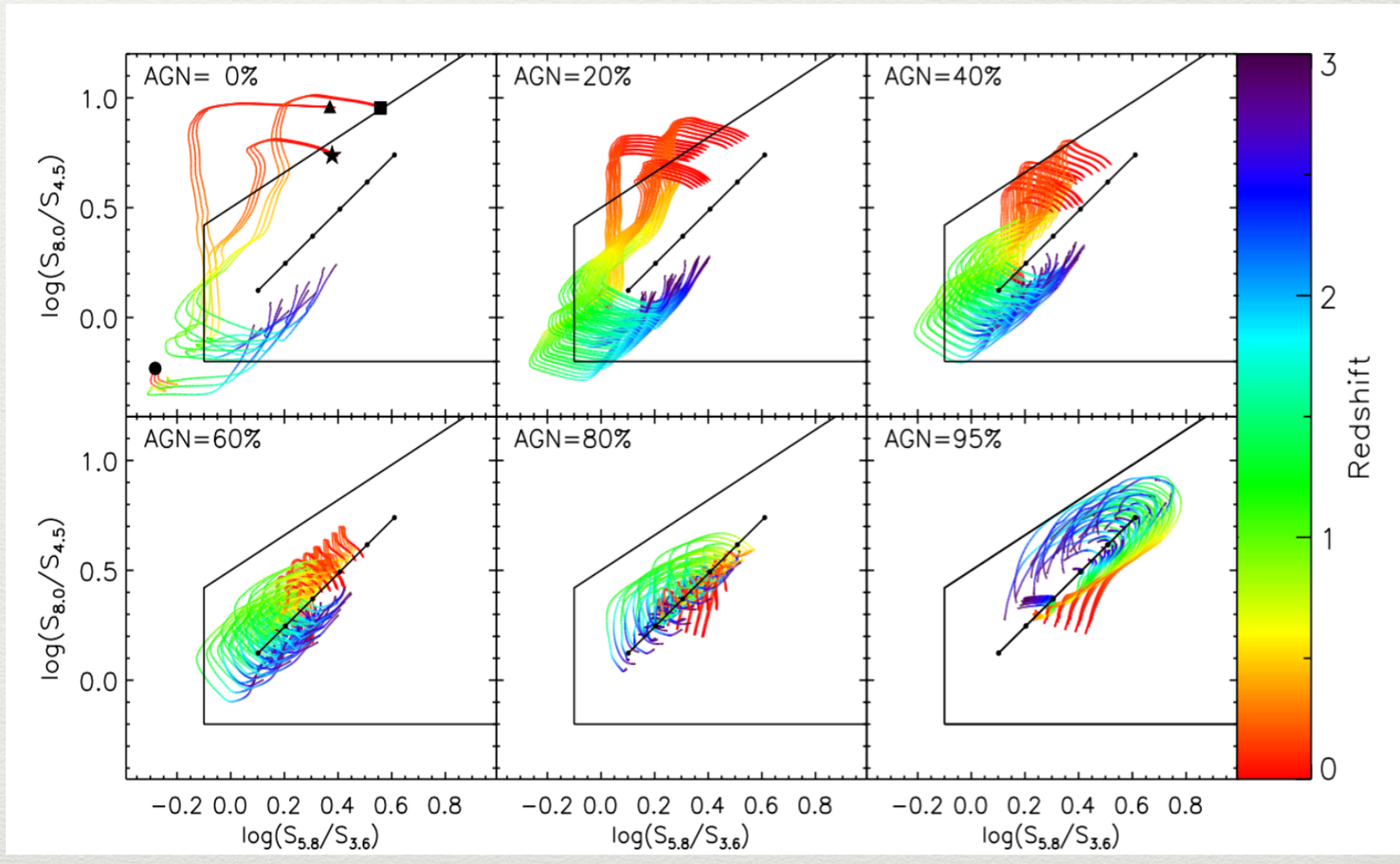
IRAC power-law selection: Incomplete, but reliable(?)



Donley+ (2012)

This simple selection picks out sources to z~3
dominated by AGN light in the mid-IR,
but it is quite free of star-bursting galaxies.

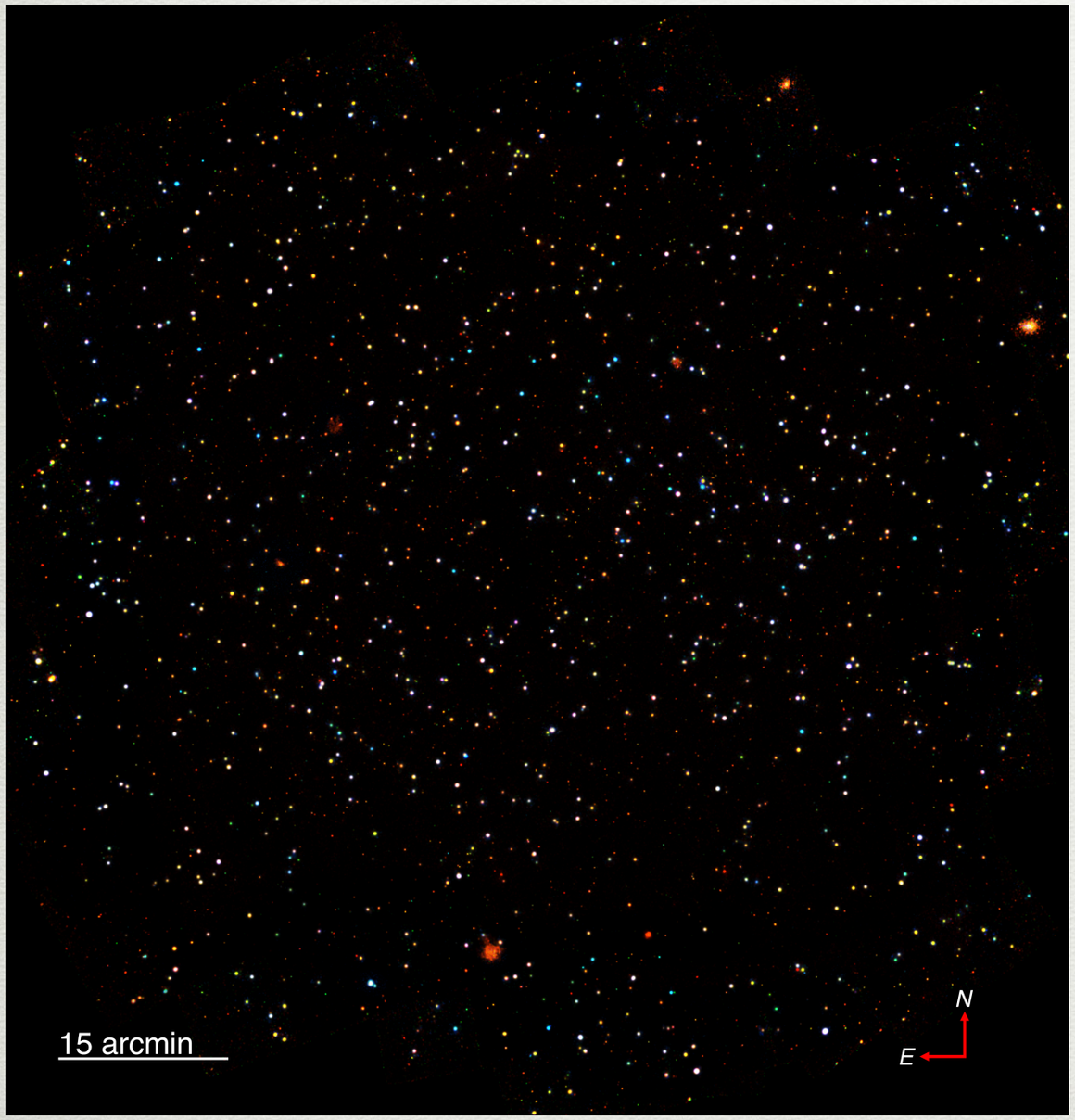




New and powerful ancillary datasets

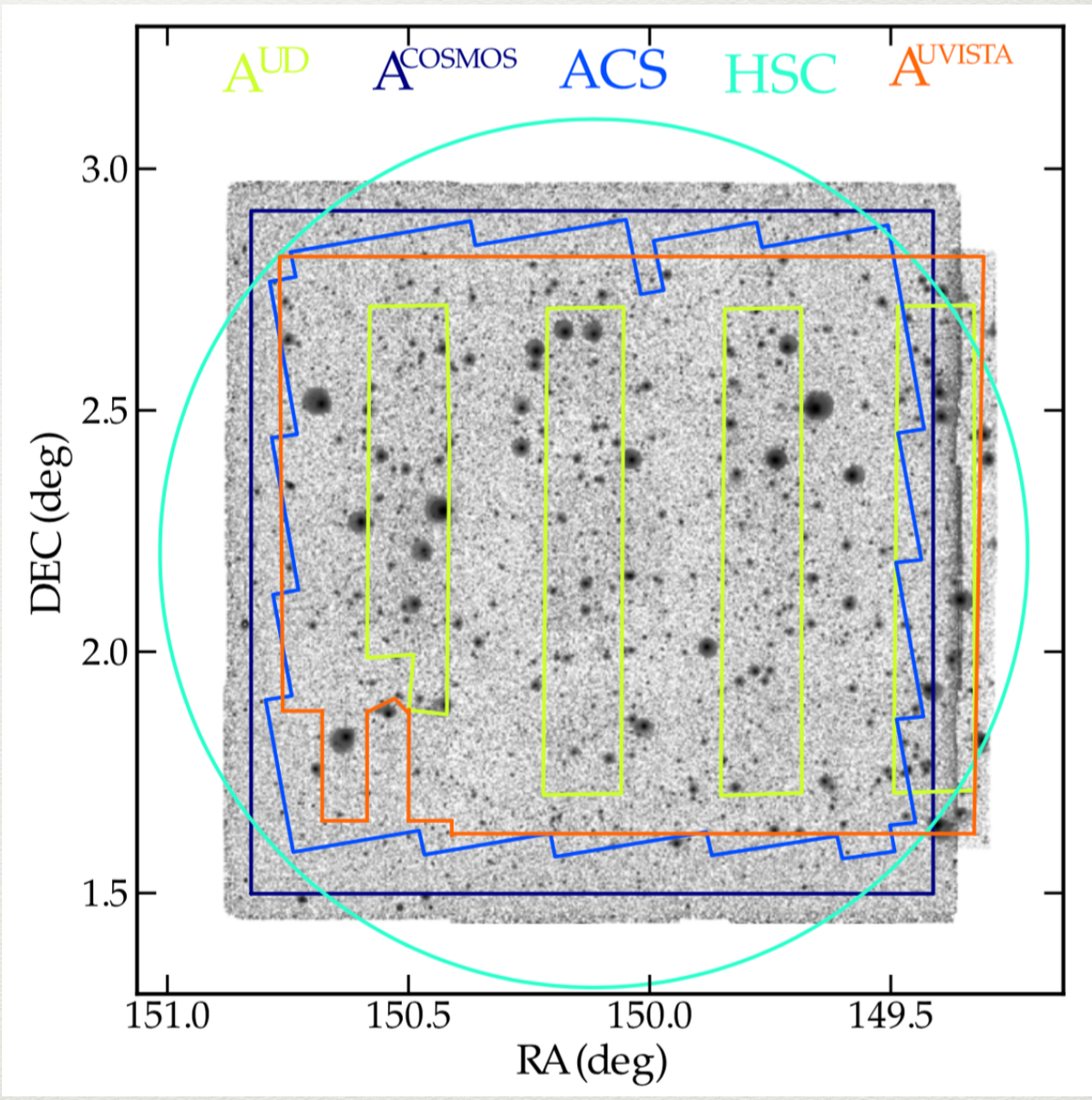
Chandra COSMOS Legacy X-ray catalog

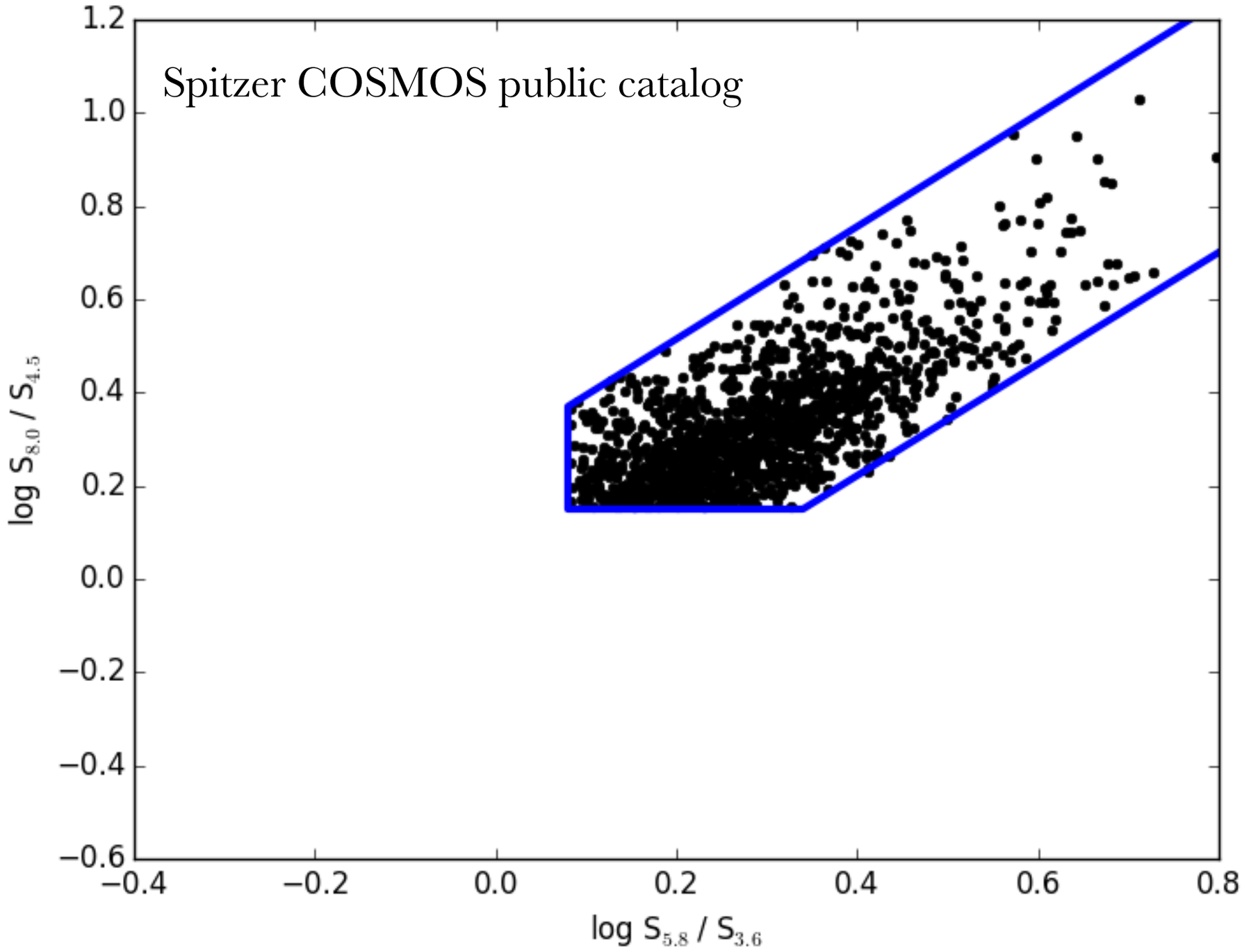
Civano+ (2016), Marchesi+ (2016)

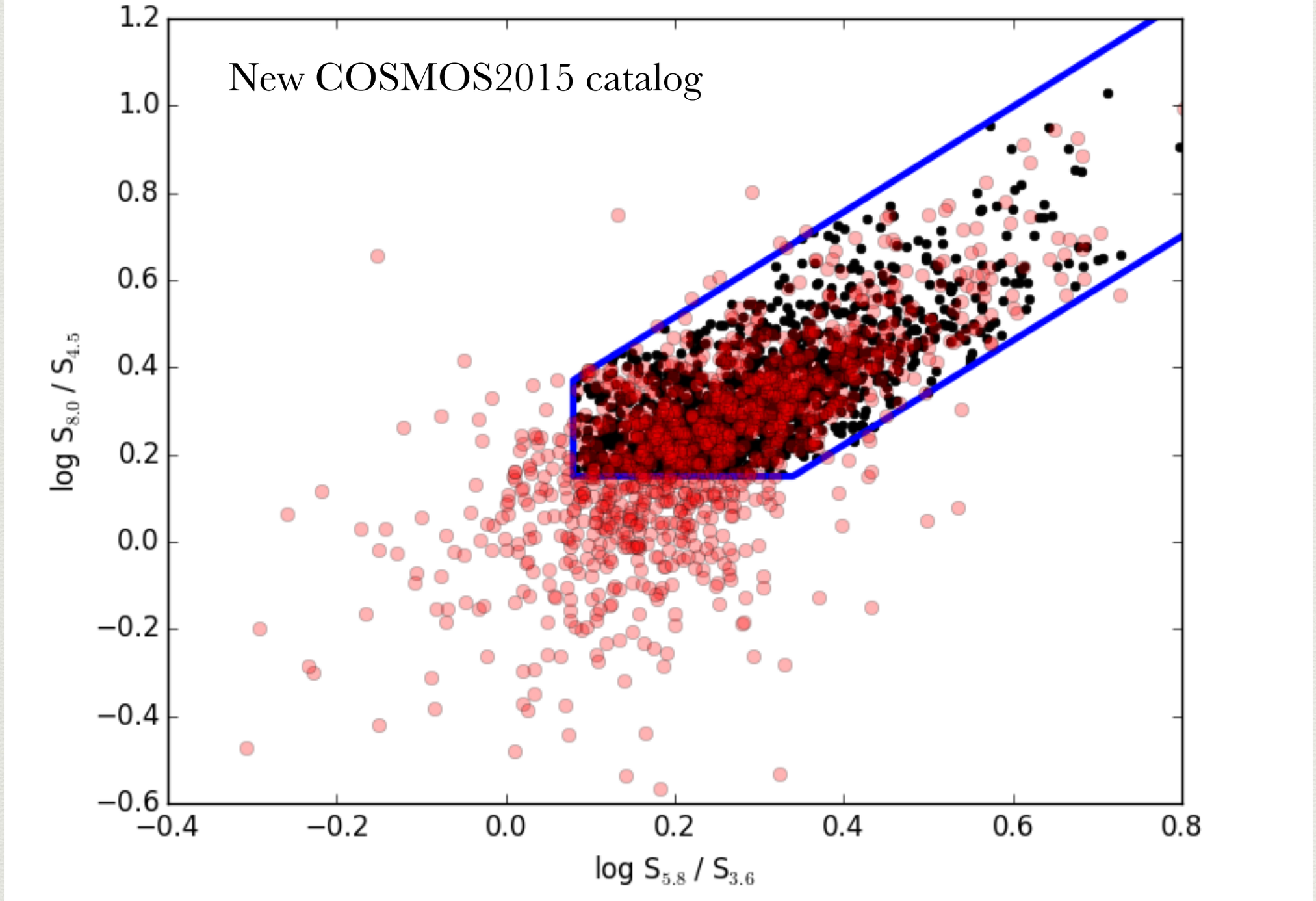


COSMOS2015 NIR-selected MW catalog

Laigle+ (2016)

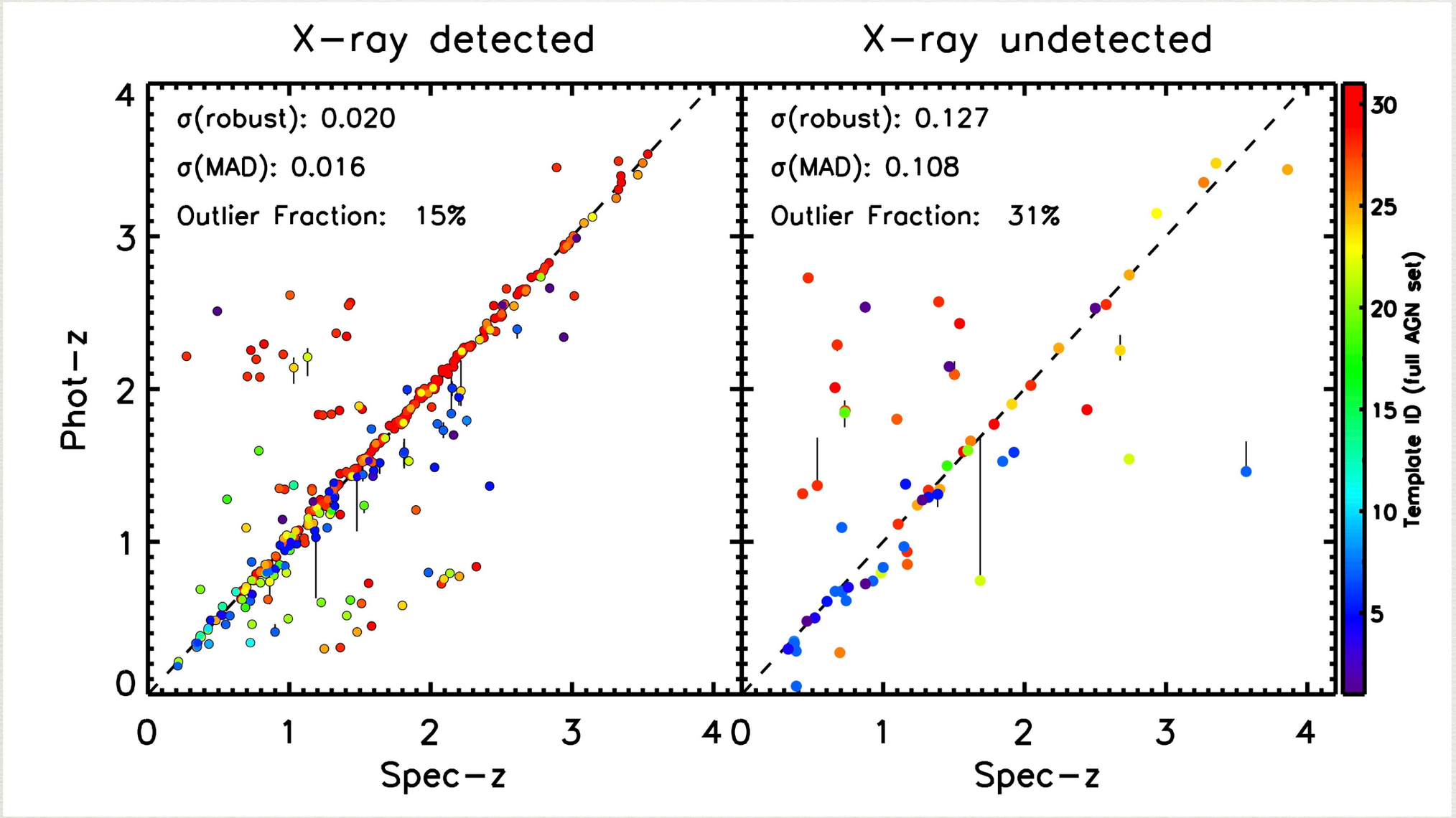



Spitzer COSMOS public catalog
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
log $S_{8.0}$ / $S_{4.5}$
log $S_{5.8}$ / $S_{3.6}$


New COSMOS2015 catalog
log S8.0 / S4.5
log S5.8 / S3.6
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8

New photometric redshifts optimised for AGN

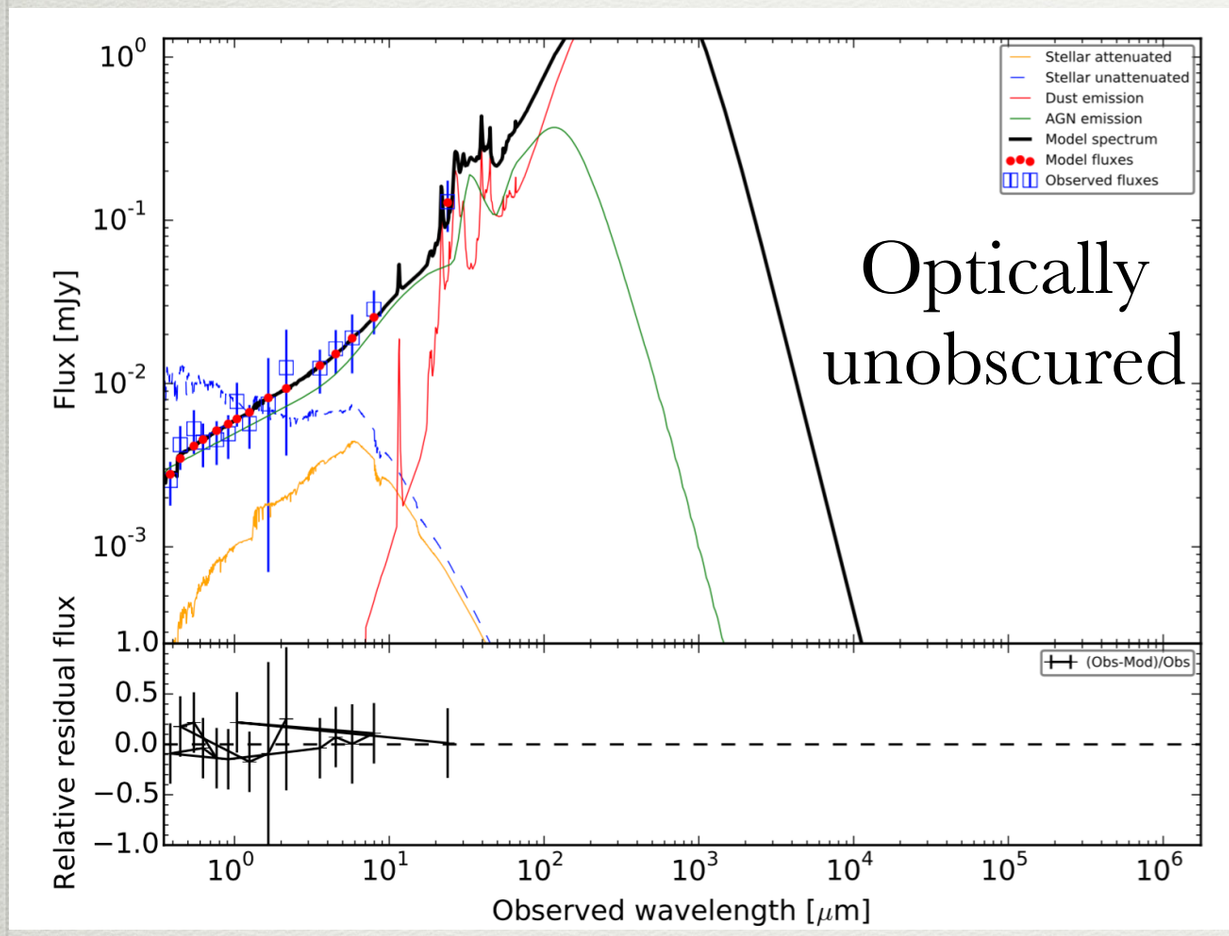
Following methodology of Salvato+ (2009), Salvato+ (2011)

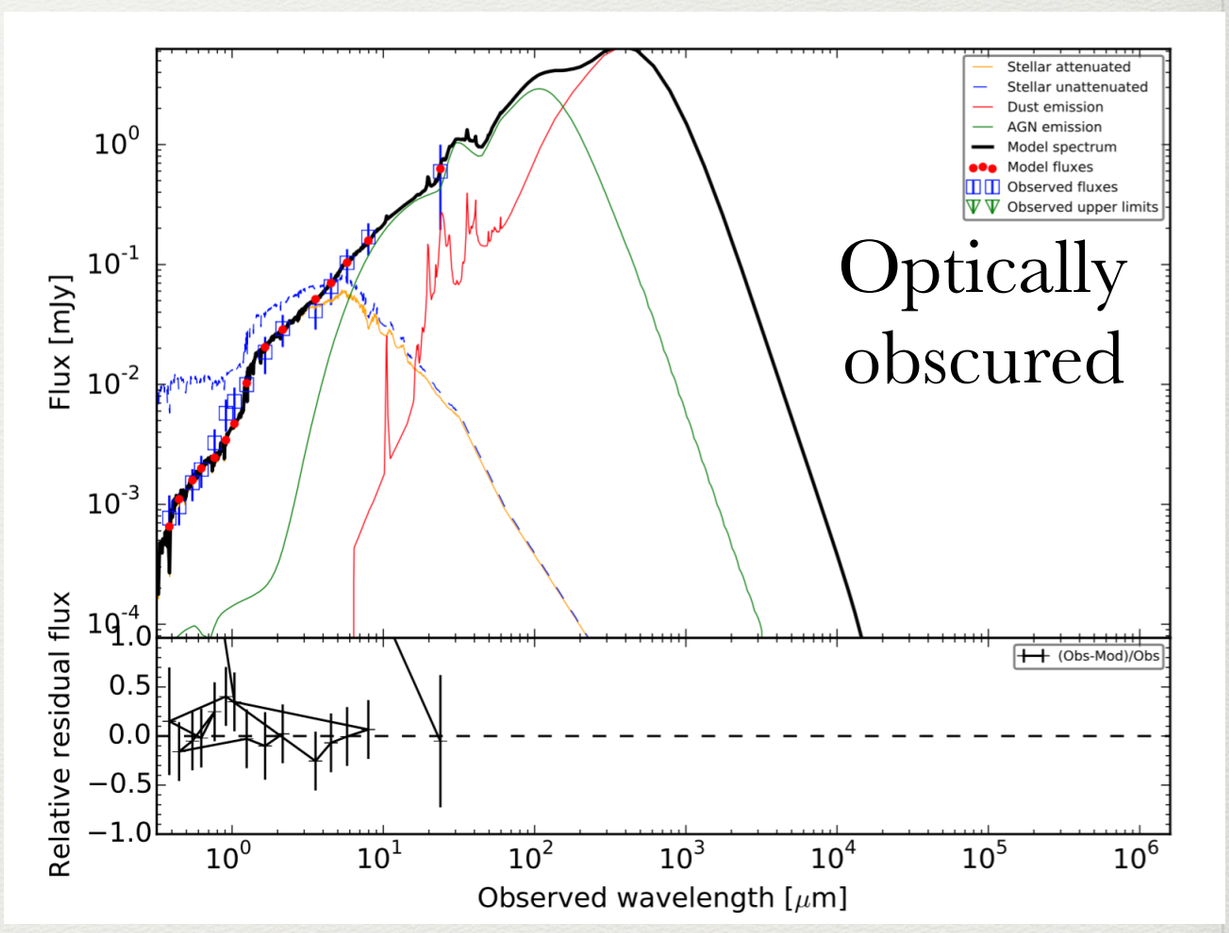


Coloured by best-fit template used for photo-z.
Blue (galaxies), low-mid green (QSO2 hybrids), late green to red (QSO1 hybrids).

Multi-component SED fits with CIGALE

Following methodology of Ciesla+ (2015) with specialised improvements

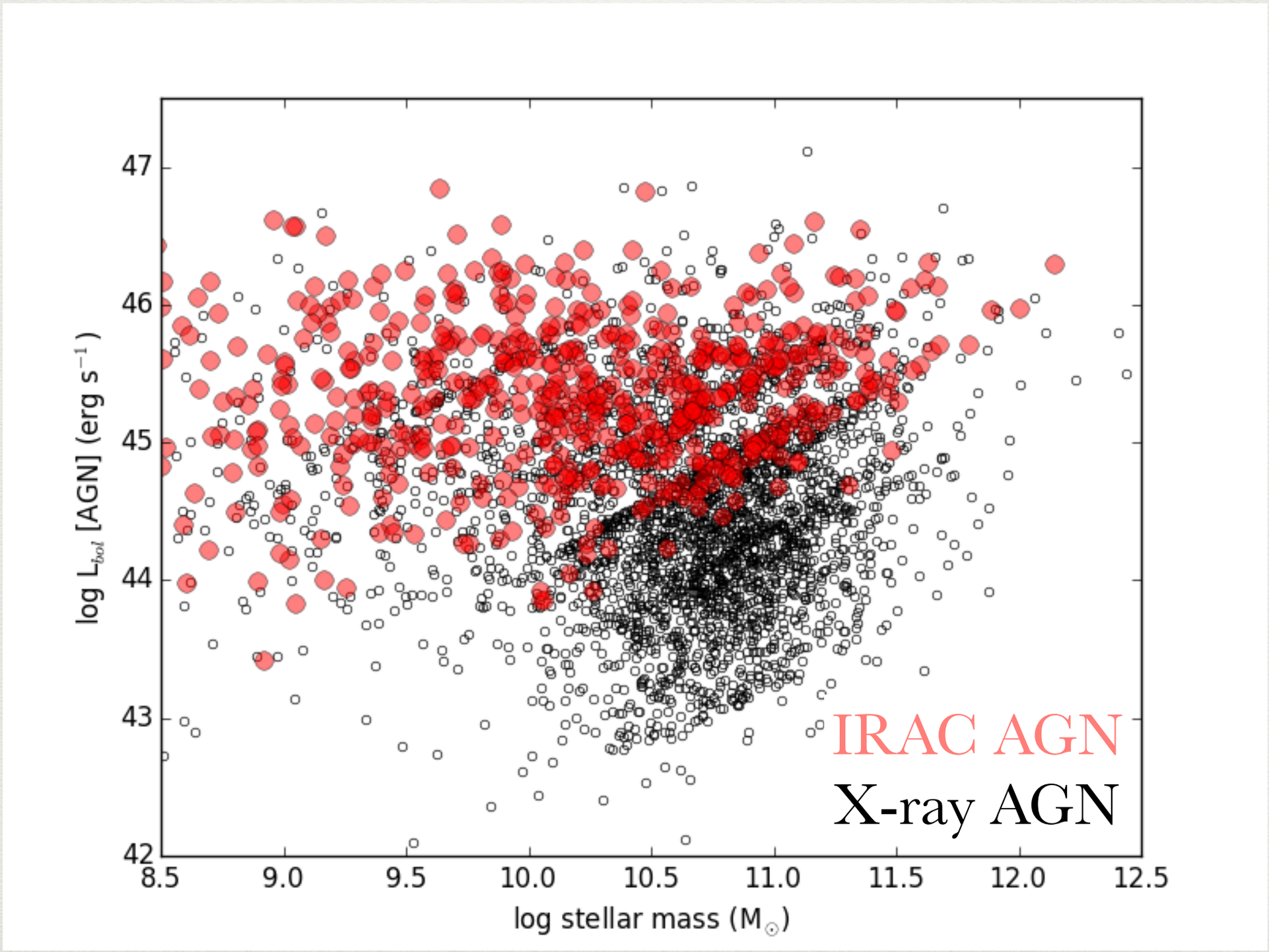




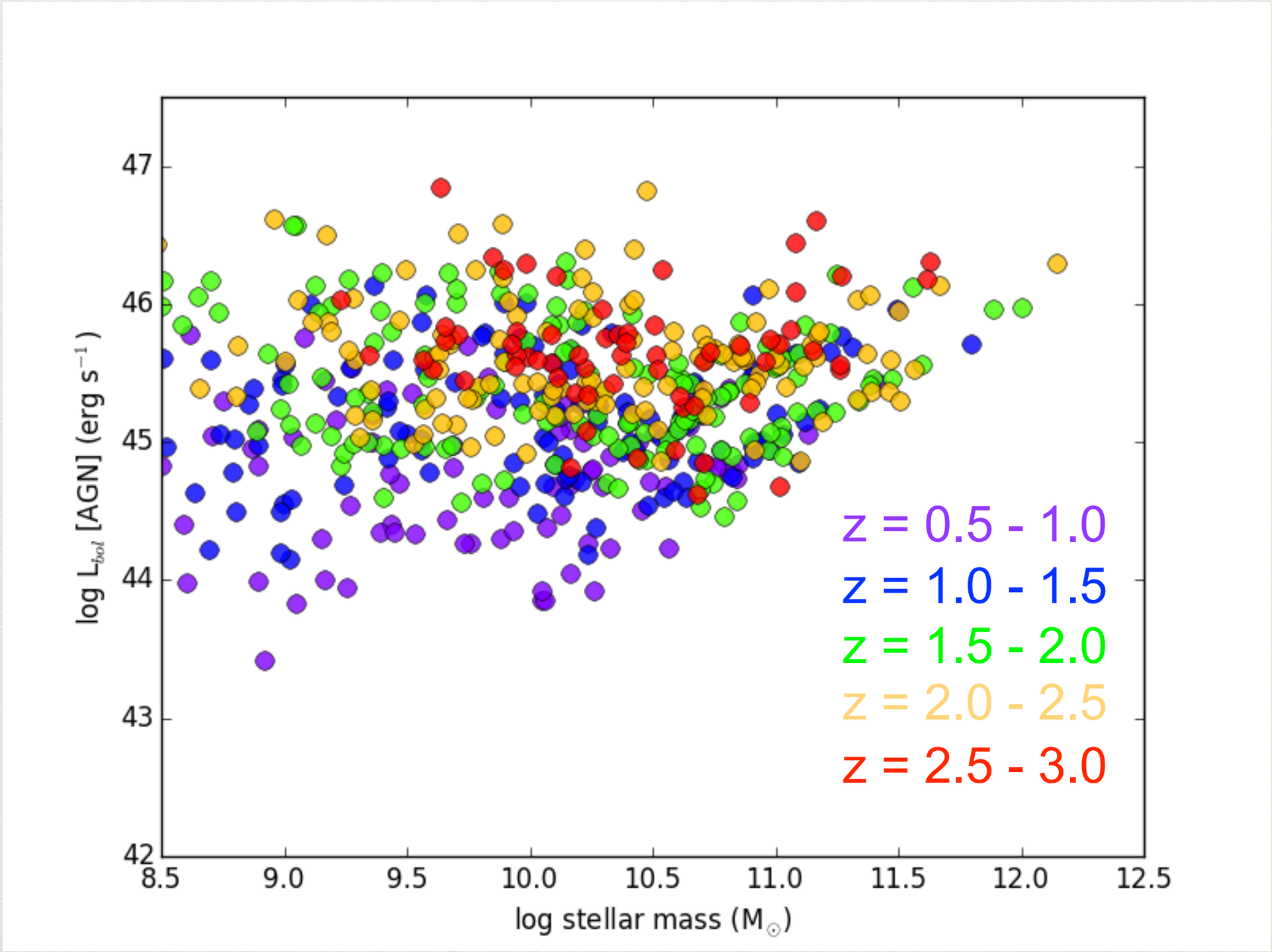
Host stellar masses, bolometric AGN luminosities and the decomposition of AGN- and SF-heated dust in the FIR.

Also for X-ray selected AGN from the Chandra Legacy program.

IRAC AGN hosts are lighter than X-ray AGN hosts



Biases!
Test before concluding evolution.



HERSCHEL DEEP SURVEYS

PEP

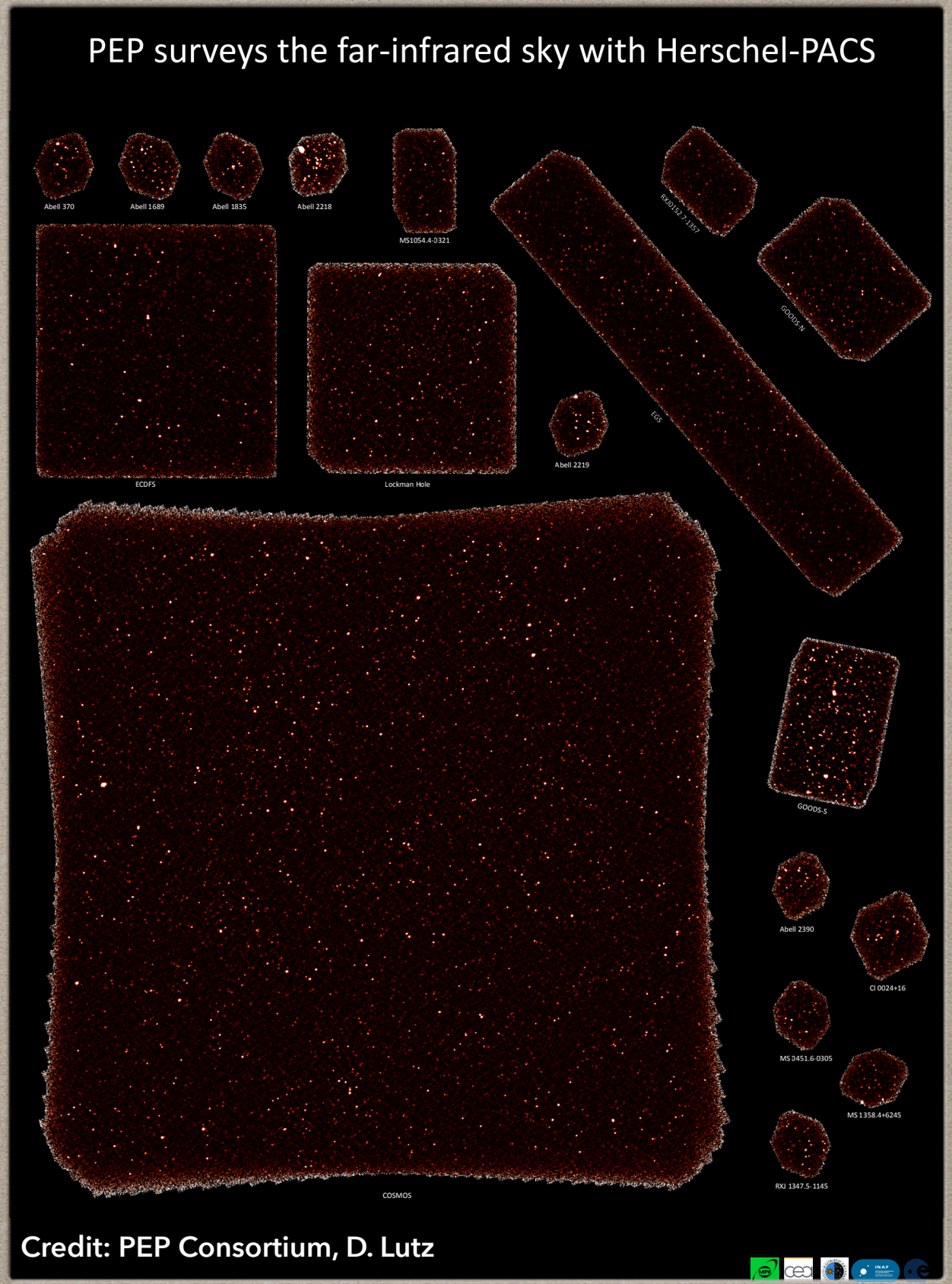
HERMES

GOODS-HERSCHEL

CANDELS-HERSCHEL

A FEW DEG^2 OF COVERAGE FROM 70 - 500 μM, TO THE CONFUSION LIMIT

OUR WINDOWS TO THE DUSTY UNIVERSE

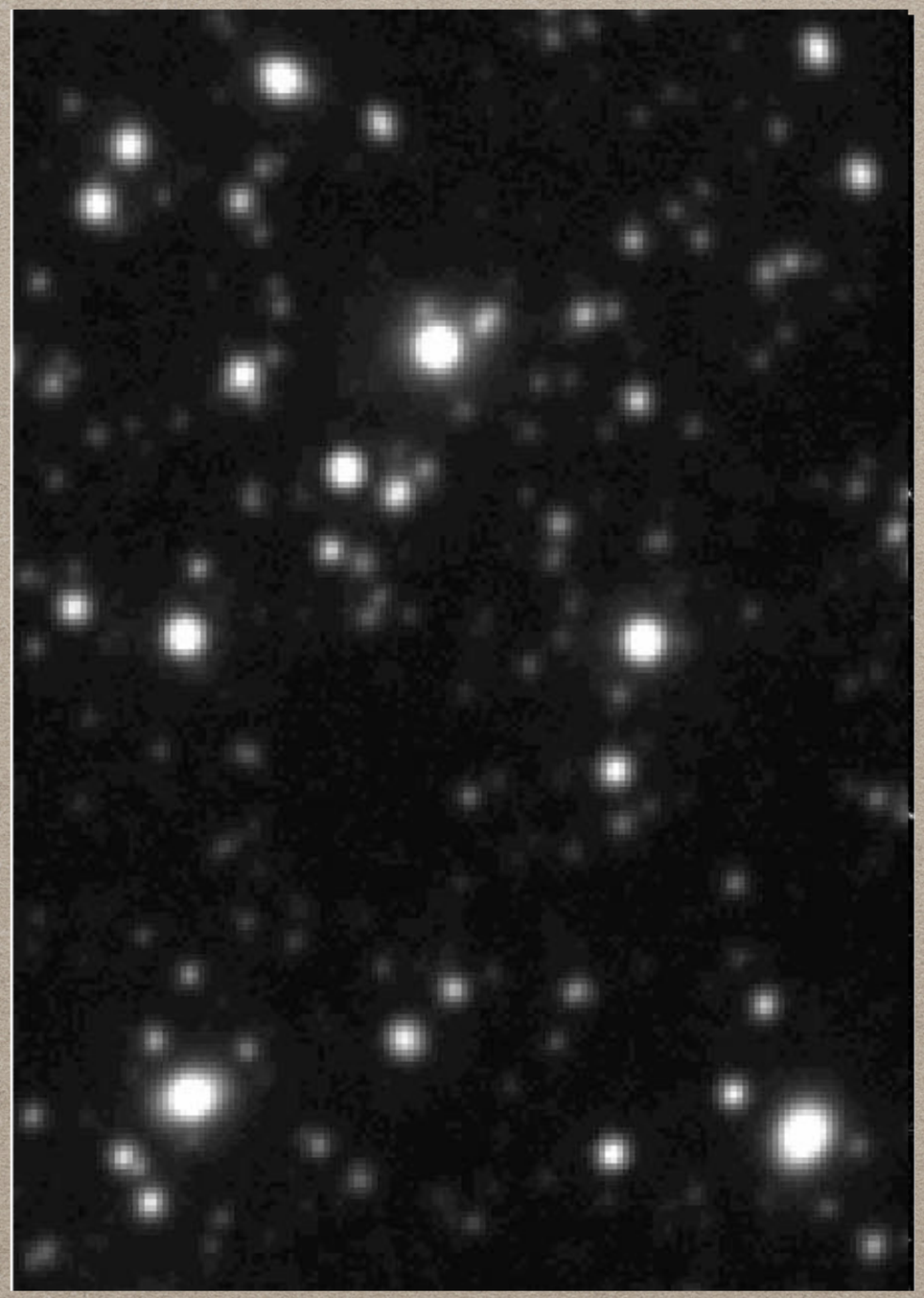


HOW DO WE USE HERSCHEL DATA?

PHOTOMETRY WITH
MULTI-WAVELENGTH
PRIORS

HST/ACS
Z-BAND

HOW DO WE USE HERSCHEL DATA?

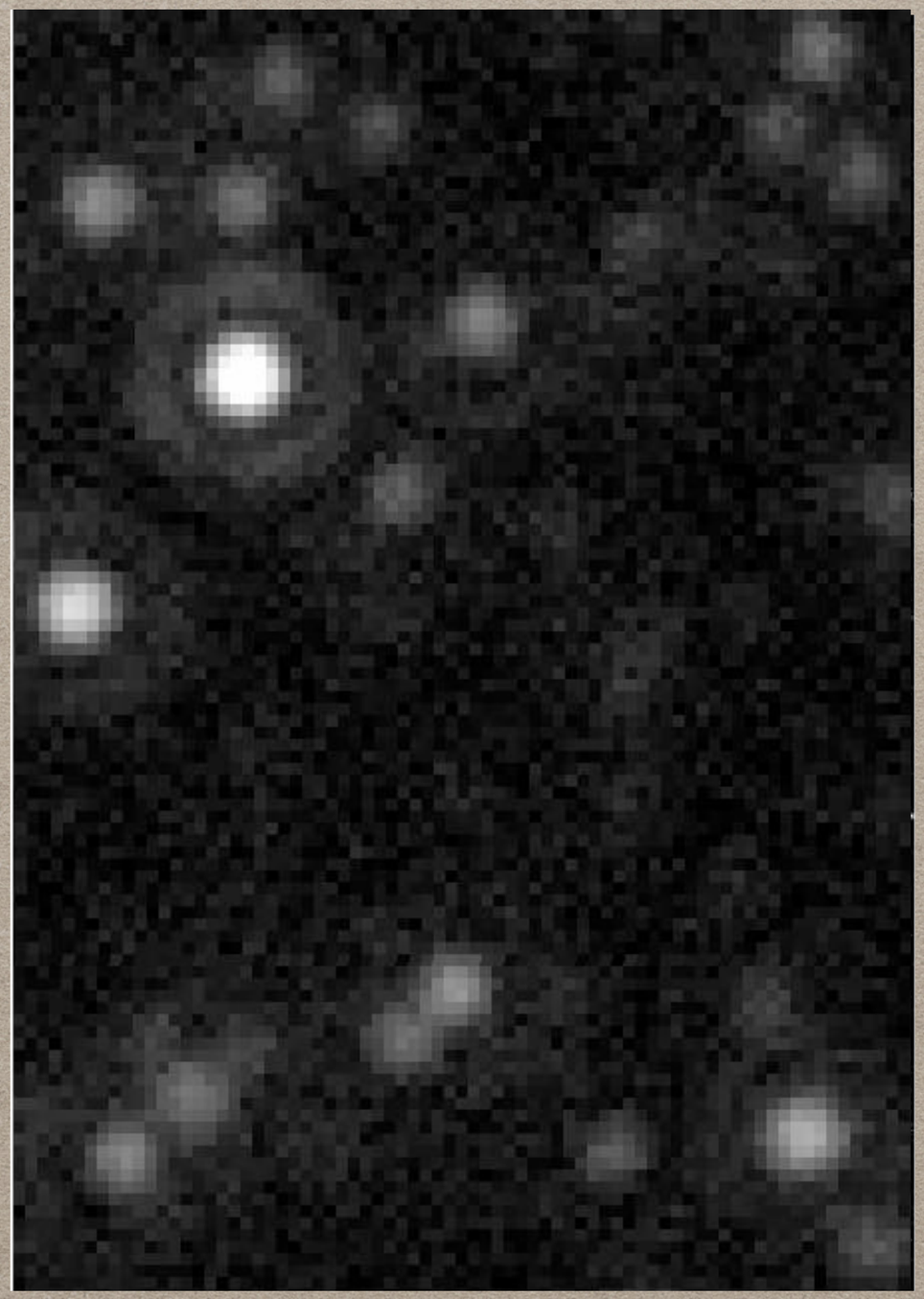


PHOTOMETRY WITH MULTI-WAVELENGTH PRIORS

SPITZER/IRAC

3.6 μm

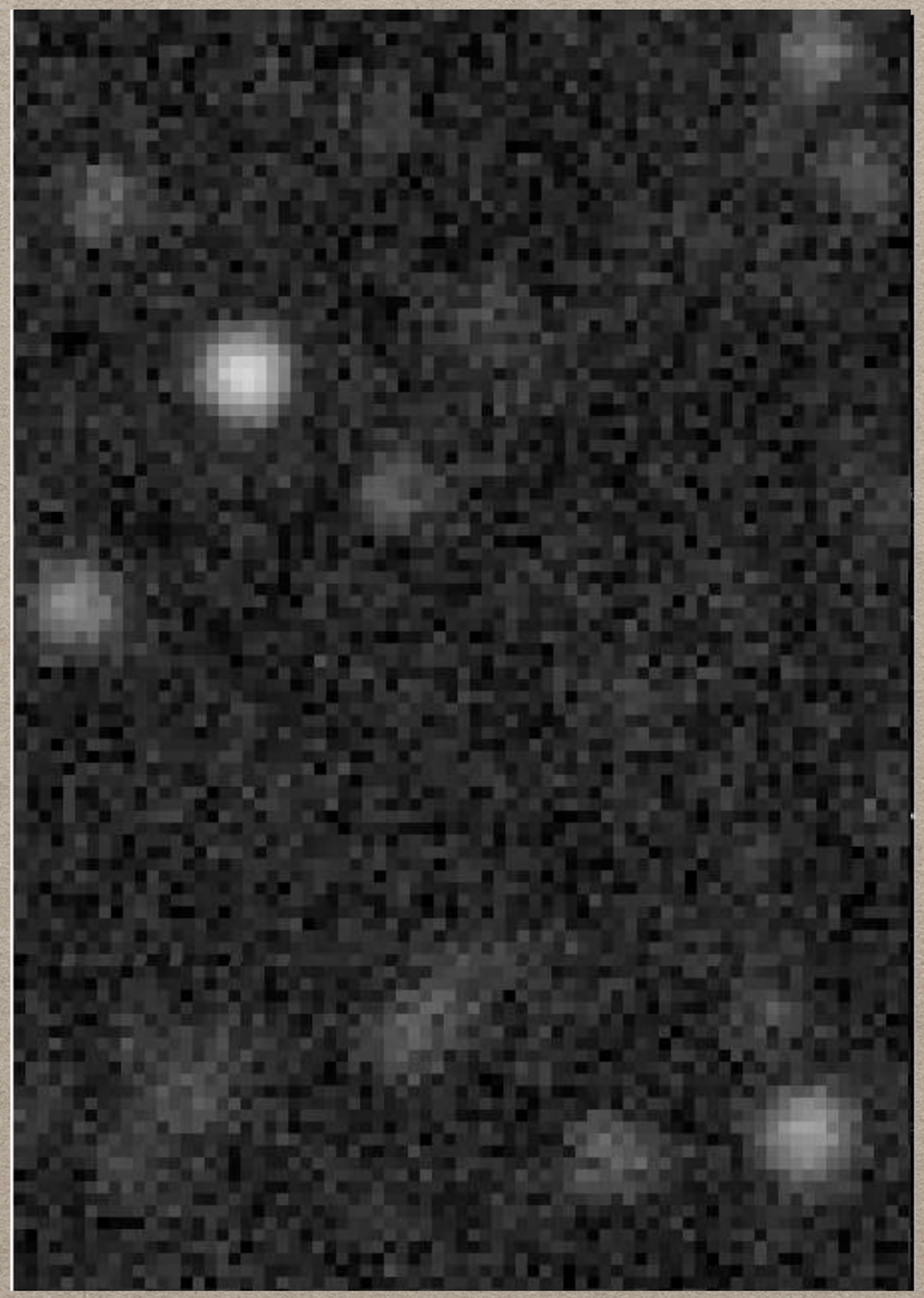
HOW DO WE USE HERSCHEL DATA?



PHOTOMETRY WITH MULTI-WAVELENGTH PRIORS

SPITZER/MIPS
24 μm

HOW DO WE USE HERSCHEL DATA?



PHOTOMETRY WITH MULTI-WAVELENGTH PRIORS

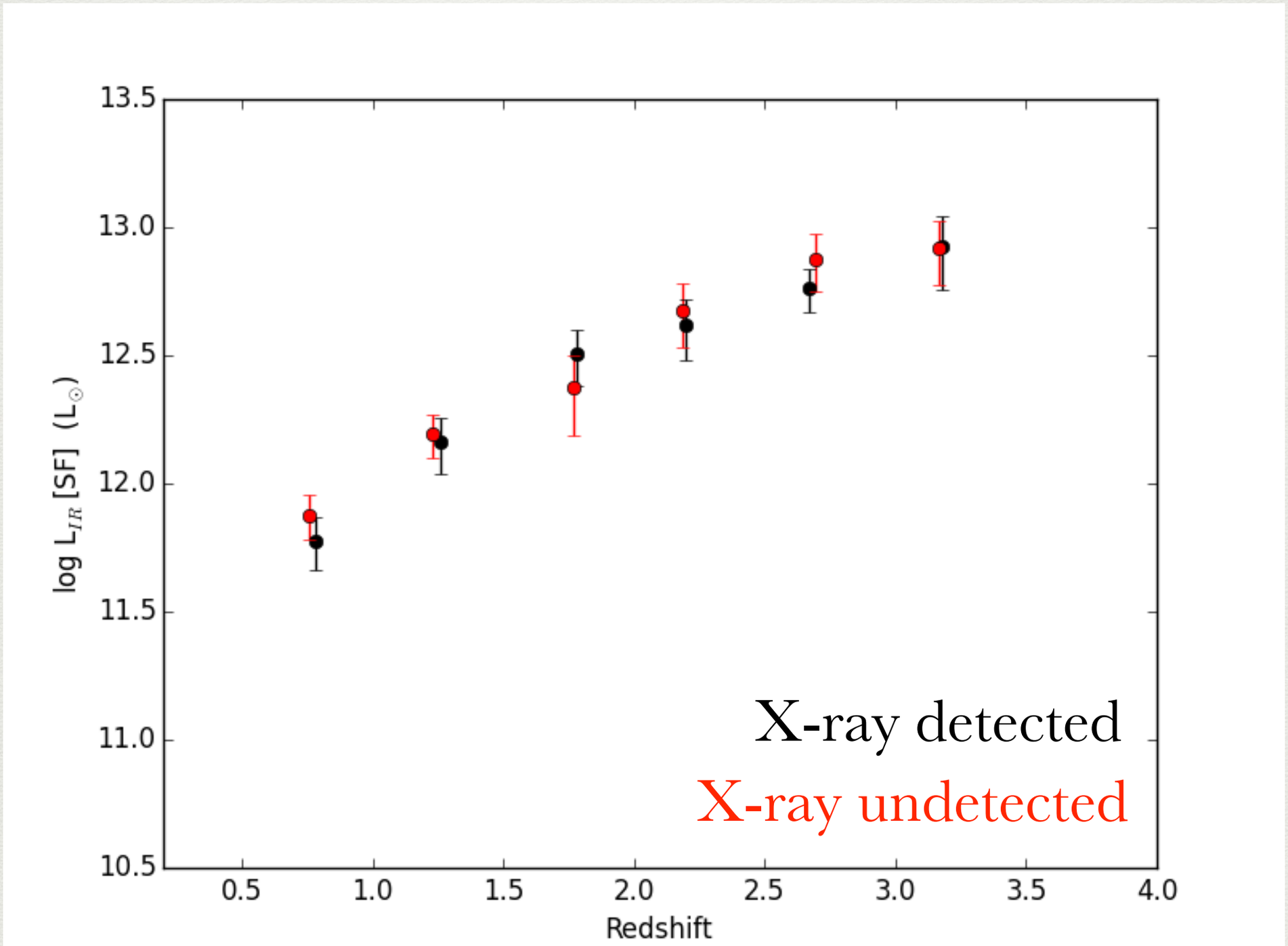
HERSCHEL/PACS
100 μm

Herschel constraints on the SFRs

About 25% of COSMOS IRAC-selected AGN are detected in at least two Herschel photometric bands.

For the rest, we stack in all 5 bands to get mean fluxes (with bootstrap errors).

The mean stacked fluxes are fit using CIGALE to get stacked FIR luminosities.


13.5
13.0
12.5
12.0
11.5
11.0
10.5
log L_{IR} [SF] ($L_\odot$)
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Redshift
X-ray detected
X-ray undetected

Current conclusions

IRAC-based selection tends to pick out luminous, low mass AGN hosts.

This leads to important biases which must be taken into account when studying these, and possibly other MIR-selected AGN samples. Especially regarding host properties, clustering, and their evolution.

To first order, X-ray detected and undetected IRAC AGN have very similar FIR-based SFRs with redshift.

Trends with stellar mass (the Main Sequence) are forthcoming.