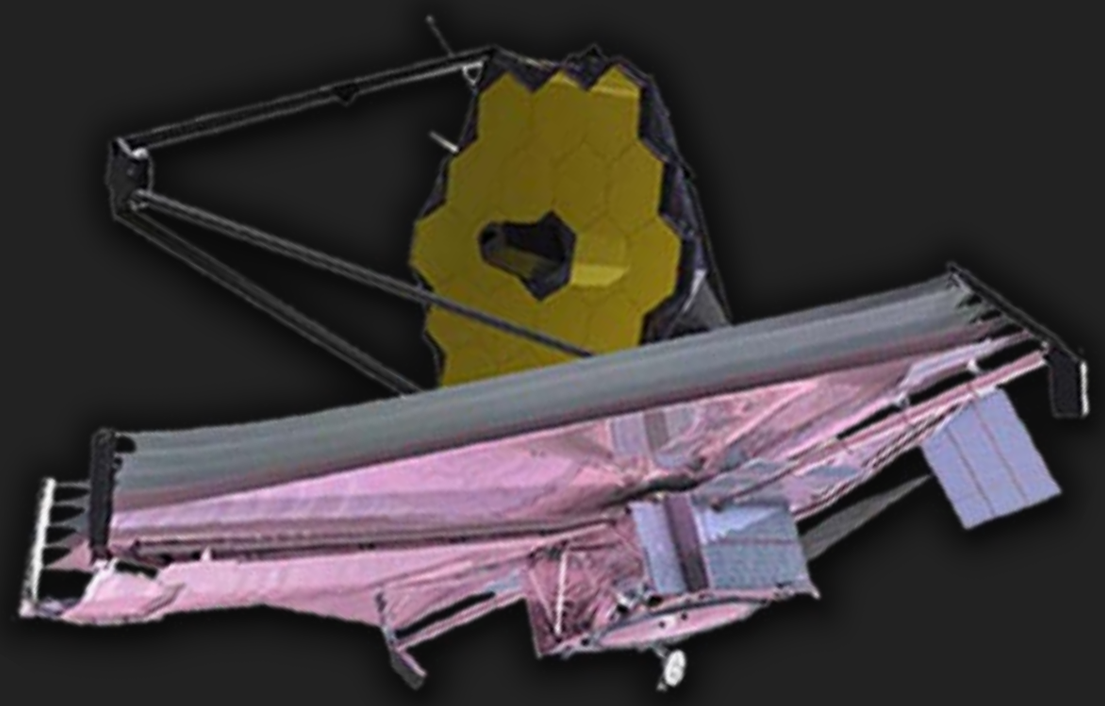


JWST BROAD-BAND IMAGING TO THE RESCUE

AGN DEMOGRAPHY

Hugo Messias, José M. Afonso, Mara Salvato, Bahram Mobasher, Andrew M. Hopkins, and the CAST team

@IAU-FM11 (2018-08-21)

TEAM WORK

THE ASTROPHYSICAL JOURNAL, 754:120 (16pp), 2012 August 1 doi:10.1088/0004-637X/754/2/120

A NEW INFRARED COLOR CRITERION FOR THE SELECTION OF $0 < z < 7$ AGNs: APPLICATION TO DEEP FIELDS AND IMPLICATIONS FOR *JWST* SURVEYS

H. MESSIAS[1,2], J. AFONSO[1], M. SALVATO[3,4], B. MOBASHER[5], AND A. M. HOPKINS[6]

A&A 562, A144 (2014)
DOI: 10.1051/0004-6361/201322267

Astronomy & Astrophysics

The dependency of AGN infrared colour-selection on source luminosity and obscuration

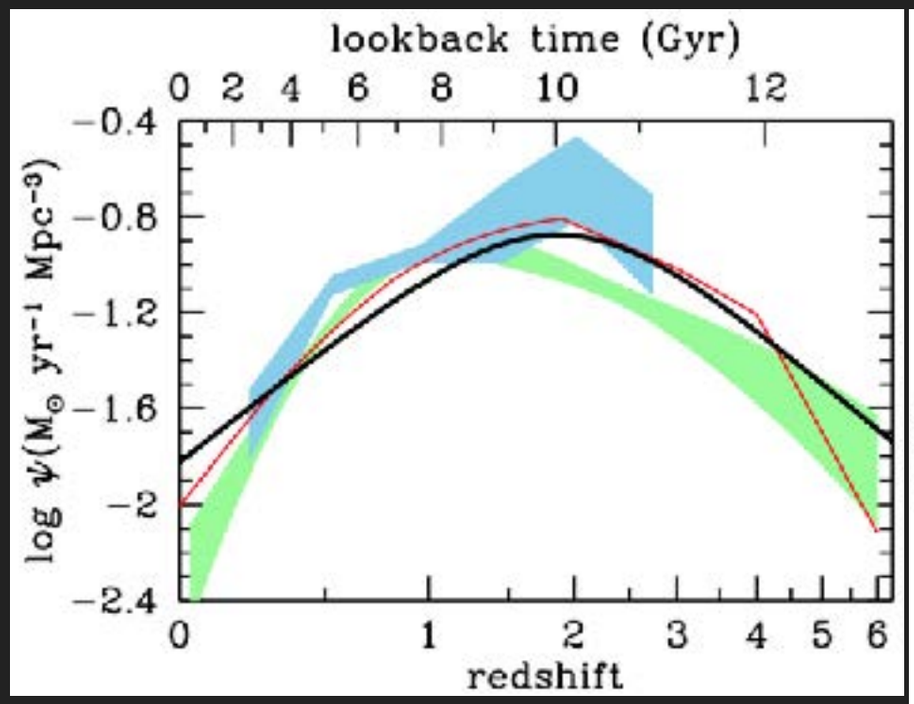
An observational perspective in CDFS and COSMOS

H. Messias[1,2], J. M. Afonso[1], M. Salvato[3,4], B. Mobasher[5], and A. M. Hopkins[6]

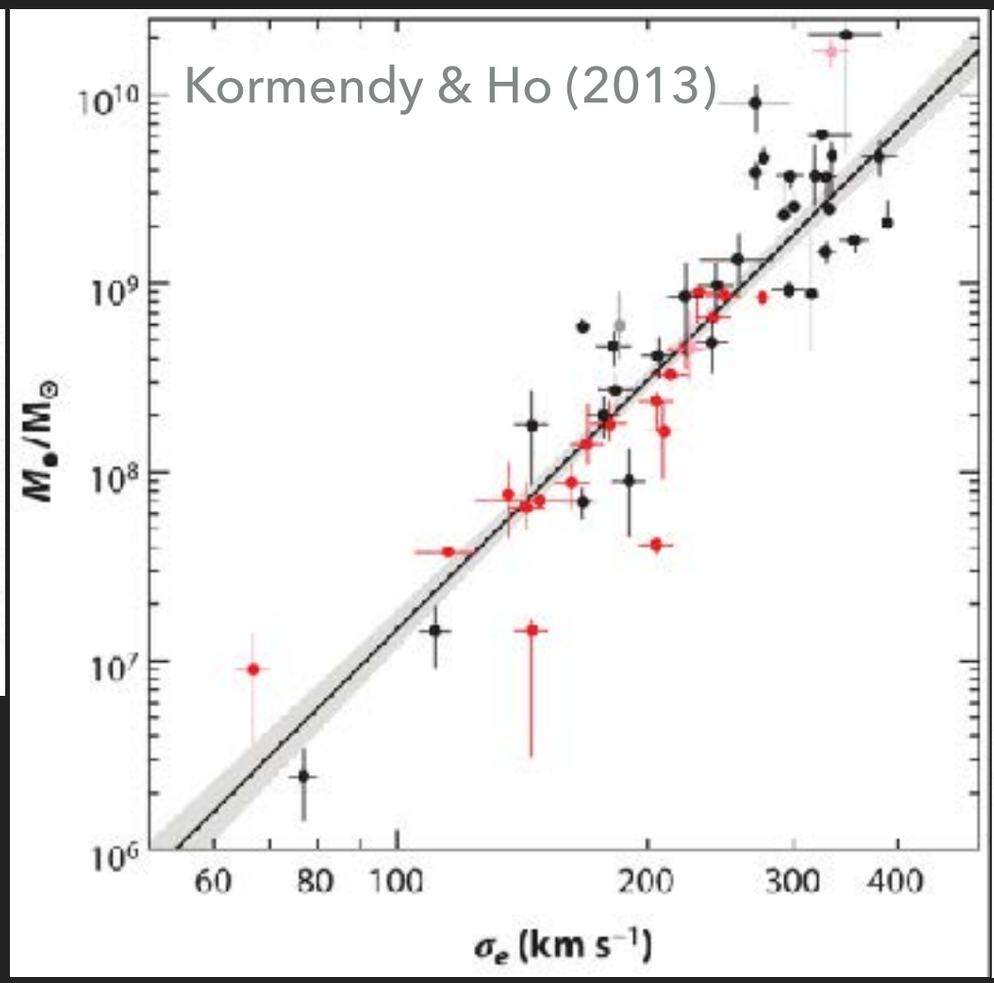
See also review by Padovani+17 (Lacy+04,07; Stern+05,12; Hatziminaoglou+05; Donley+12; Assef+13; ...)

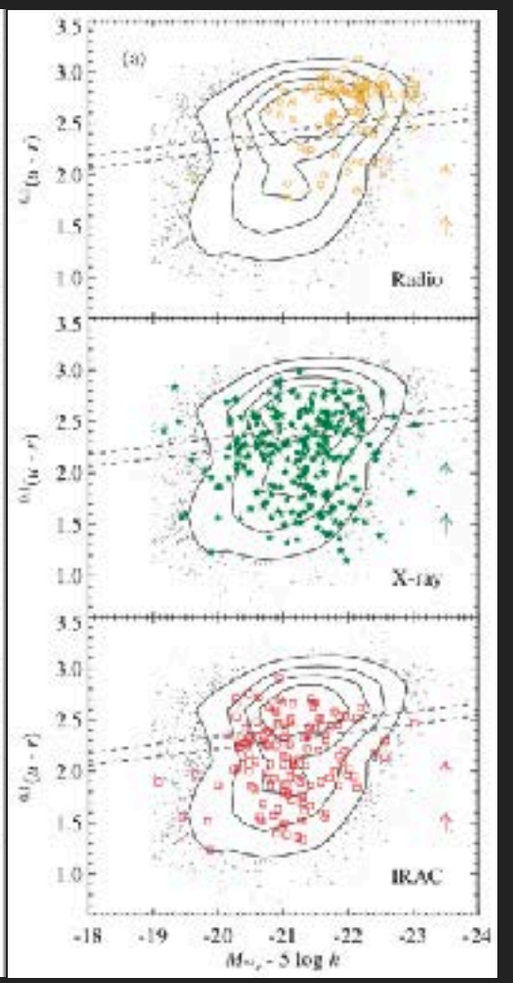
WHY SEARCH FOR AGN?

- Common z~2 peak, M-σ relation, host vs accretion mode



Madau & Dickinson (2014)

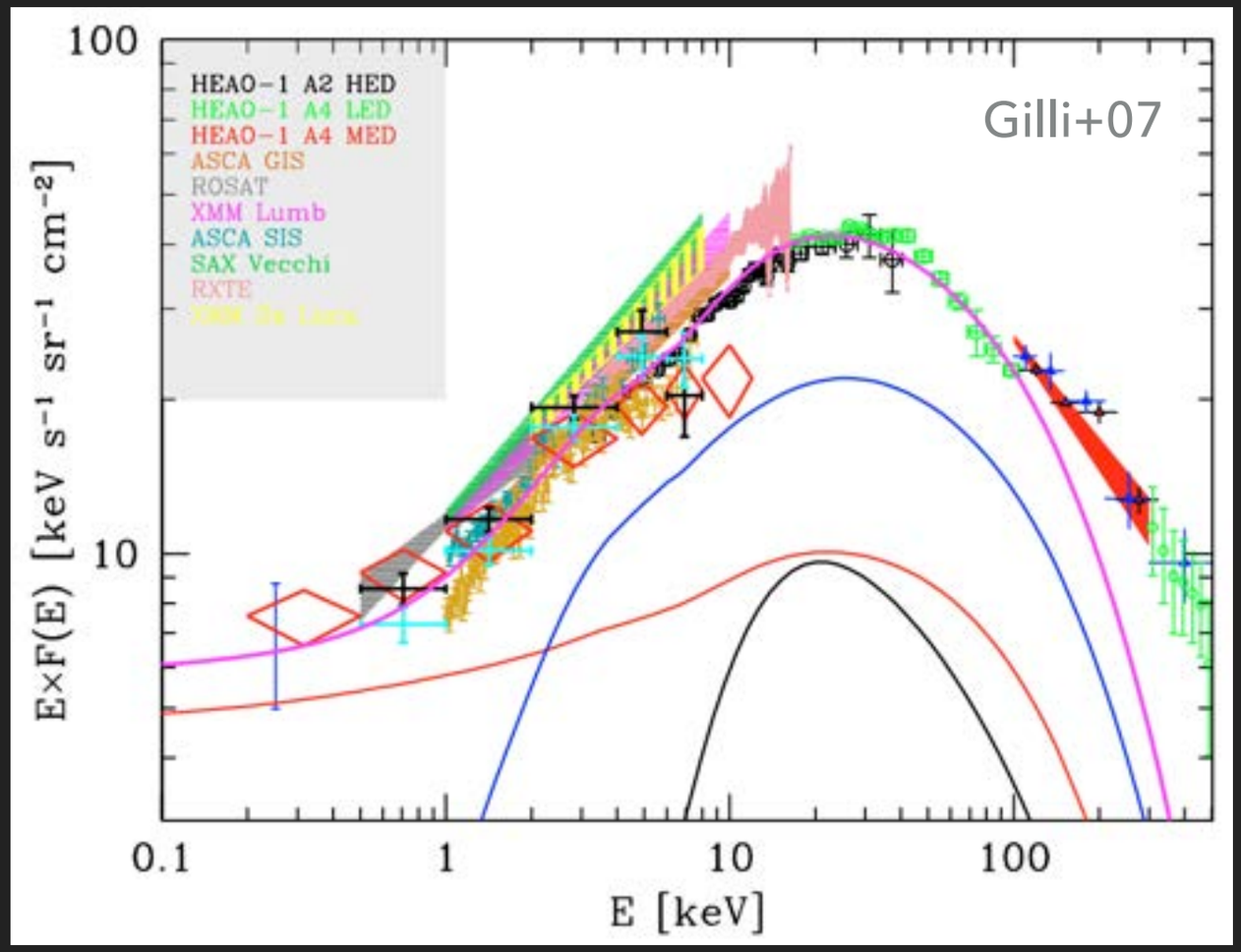


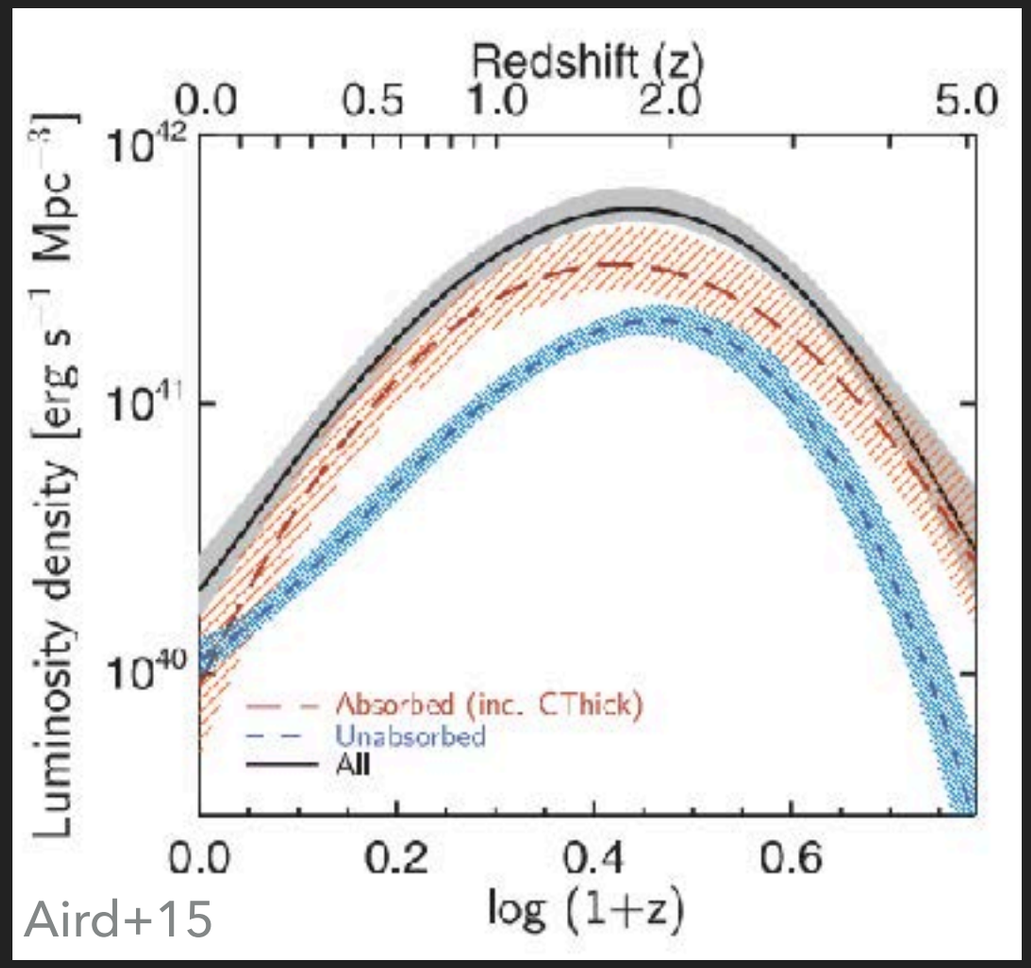


Hickox+09

WHY SEARCH FOR DUSTY[1] AGN?

- X-ray background and obscured-phase growth



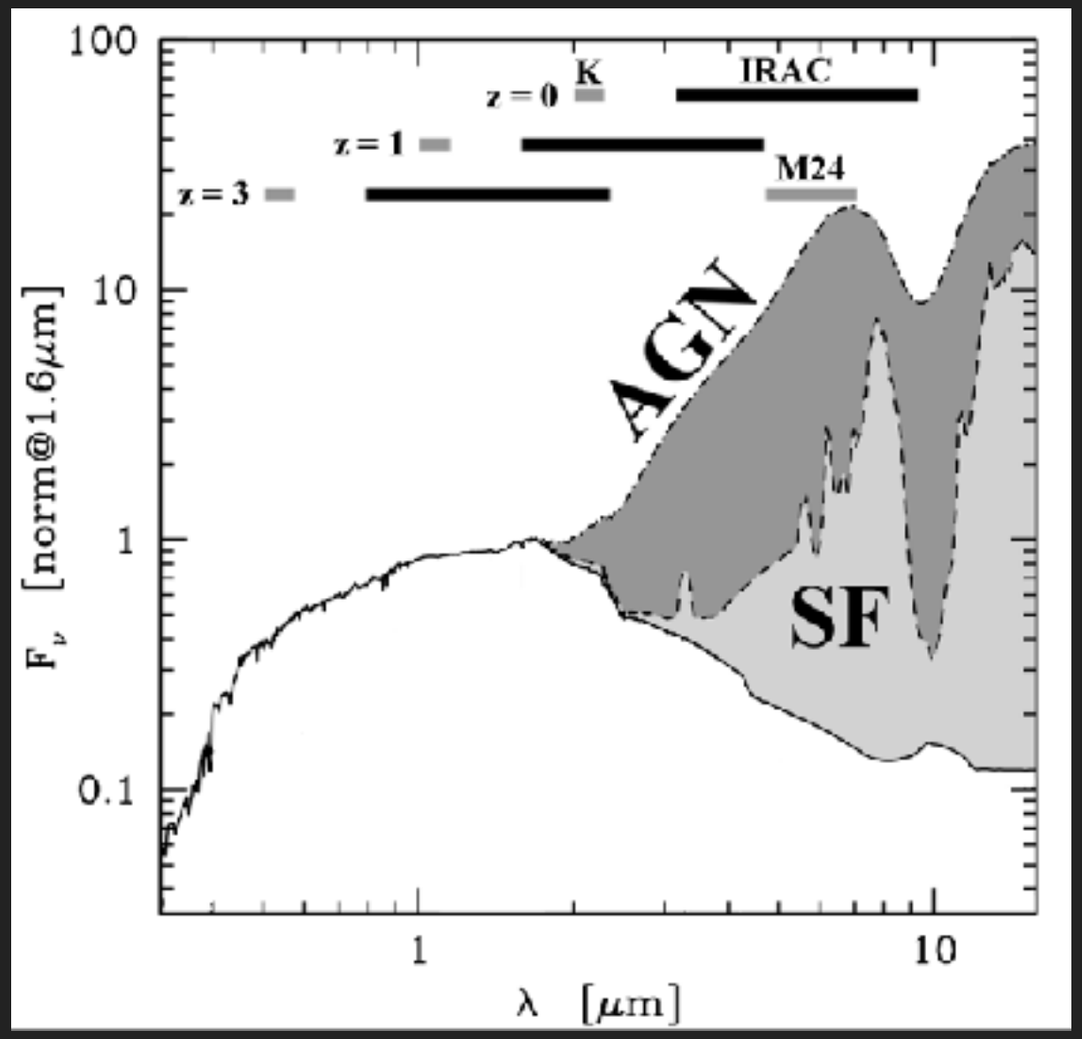


Aird+15

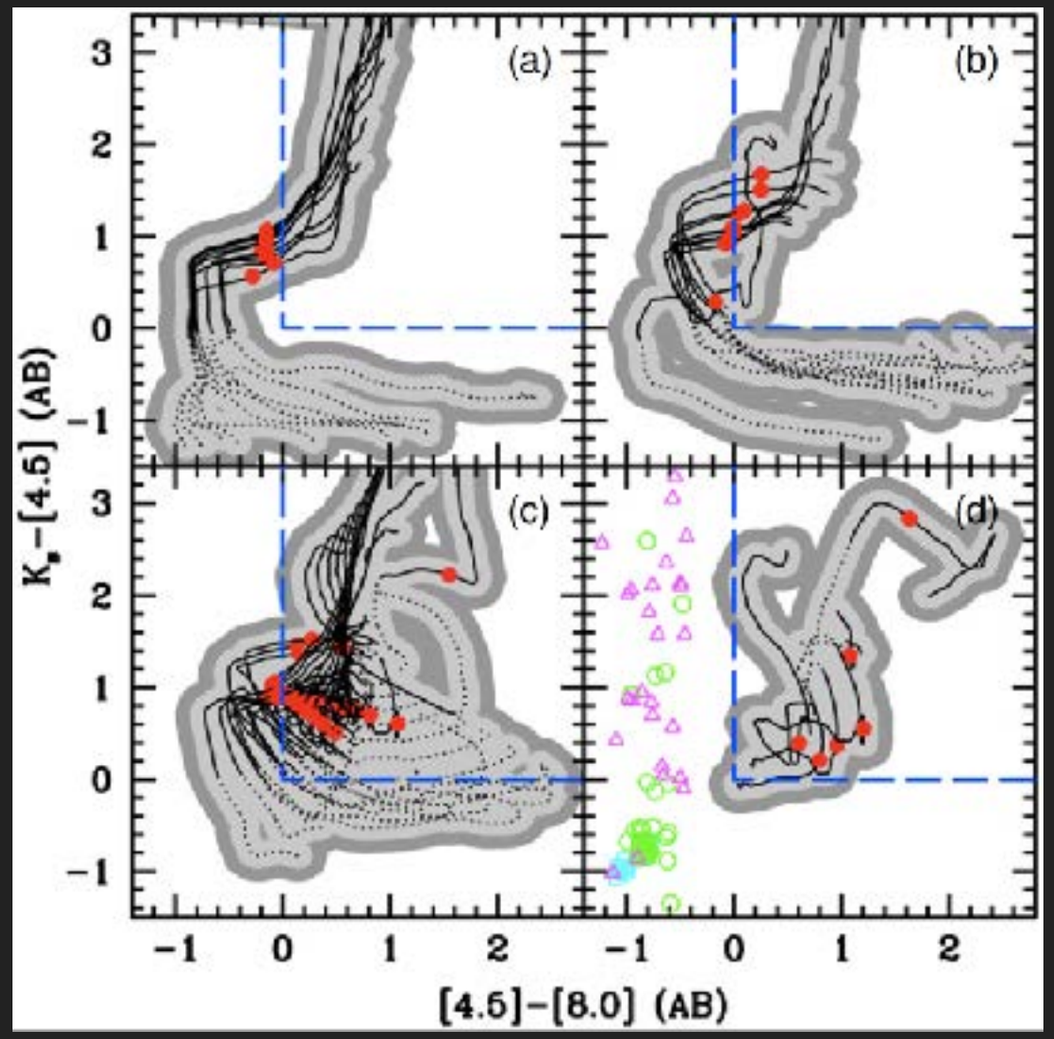
[see also Treister+12]

1 – WITH DUST AROUND, NOT NECESSARILY OBSCURED IN THE LINE-OF-SIGHT

SELECTING AGN IN THE IR

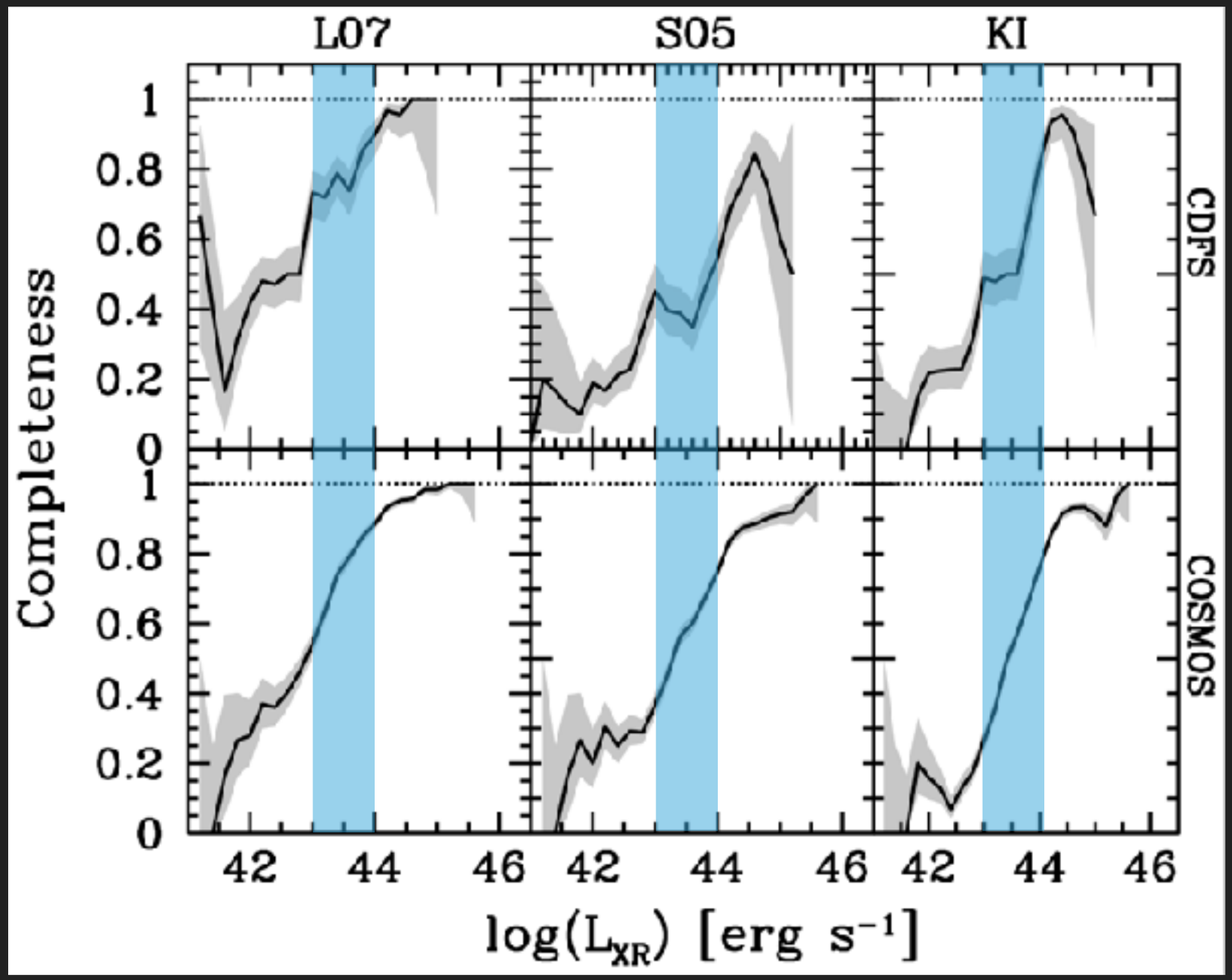


Messias+12, 14
[see also review by Padovani+17]



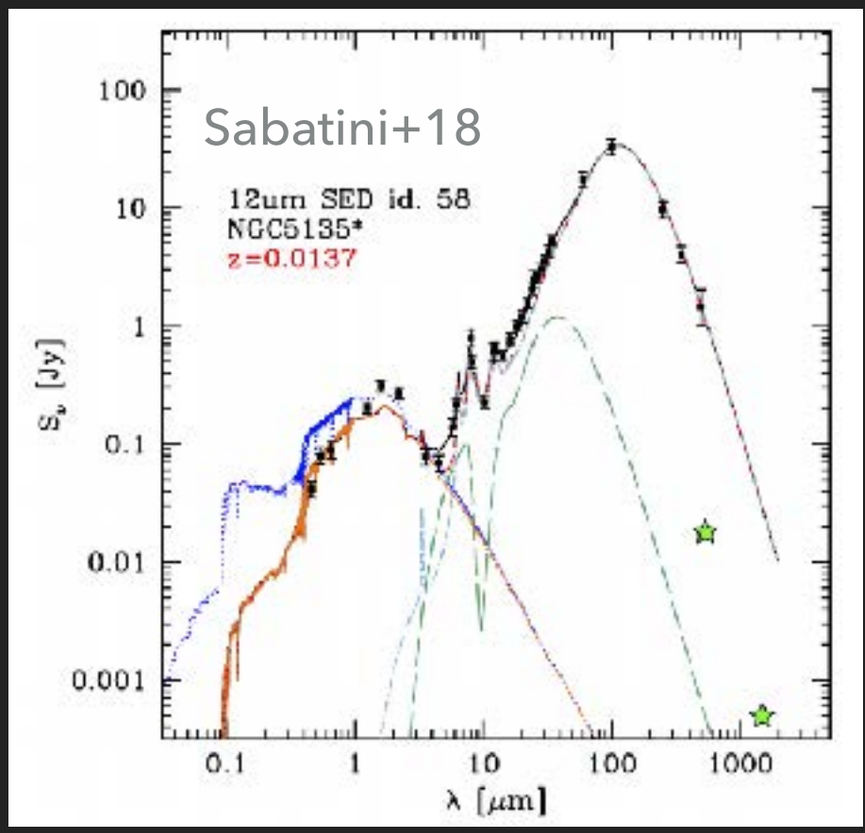
(a) early/late ; (b) pure-starburst ;
(c) starburst+AGN ; (d) pure-AGN

CURRENT PROBLEMS

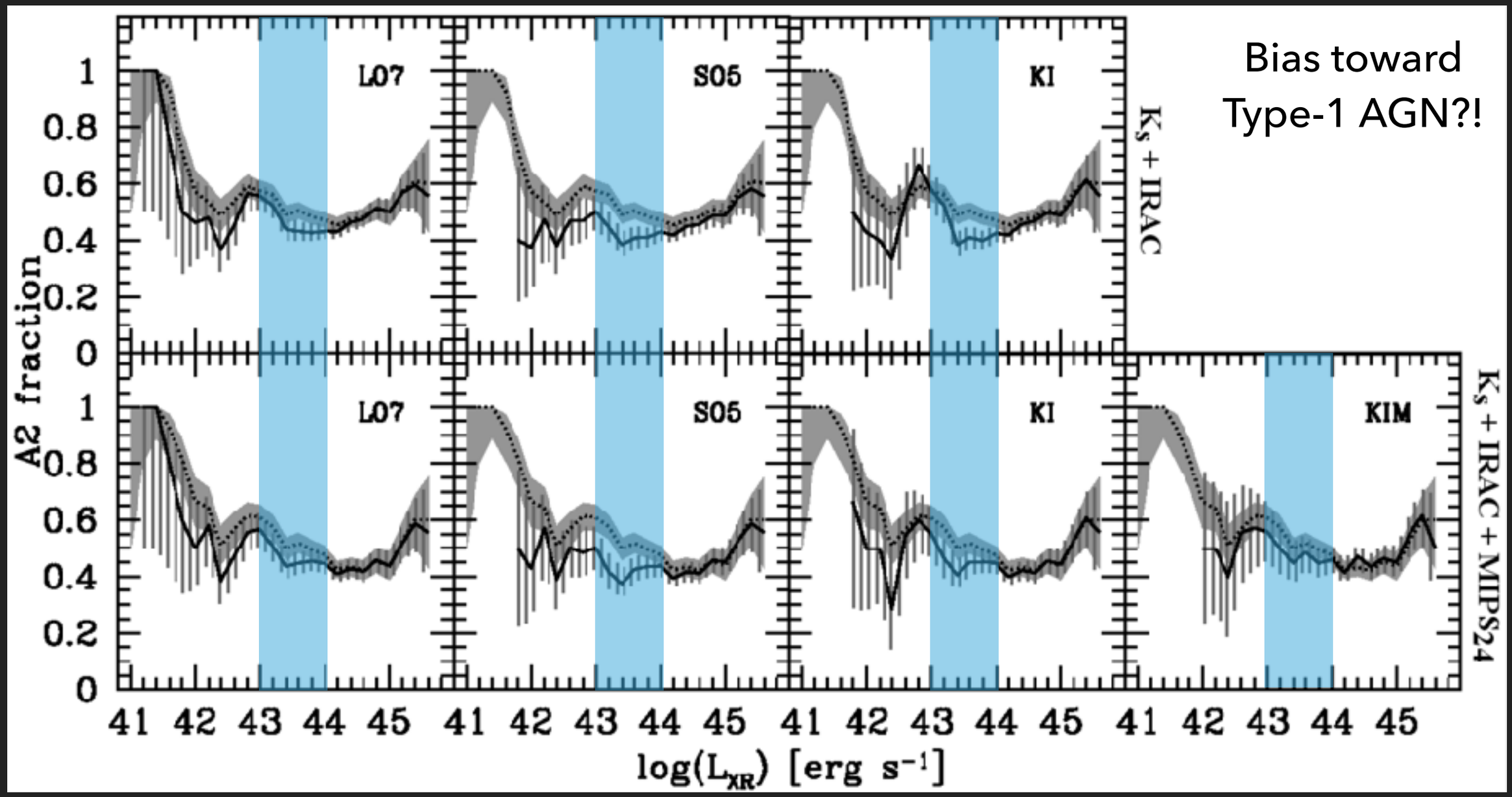


Messias+14 (fig.3)

- Completeness@ 40-50% log(L_X[erg/s])=43-44



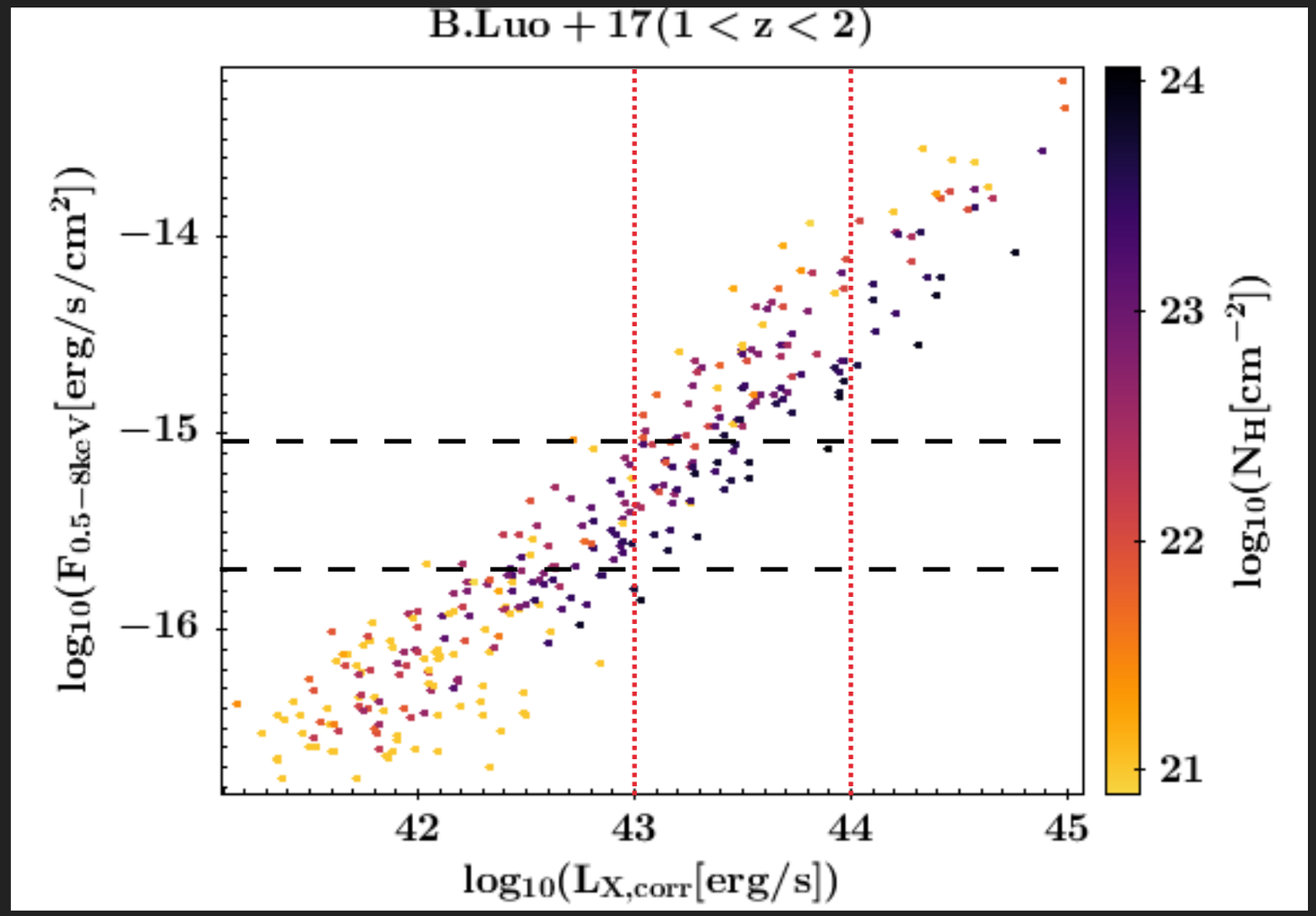
CURRENT PROBLEMS



Bias toward Type-1 AGN?!

Messias+12 (fig.5) [see also Treister+09]

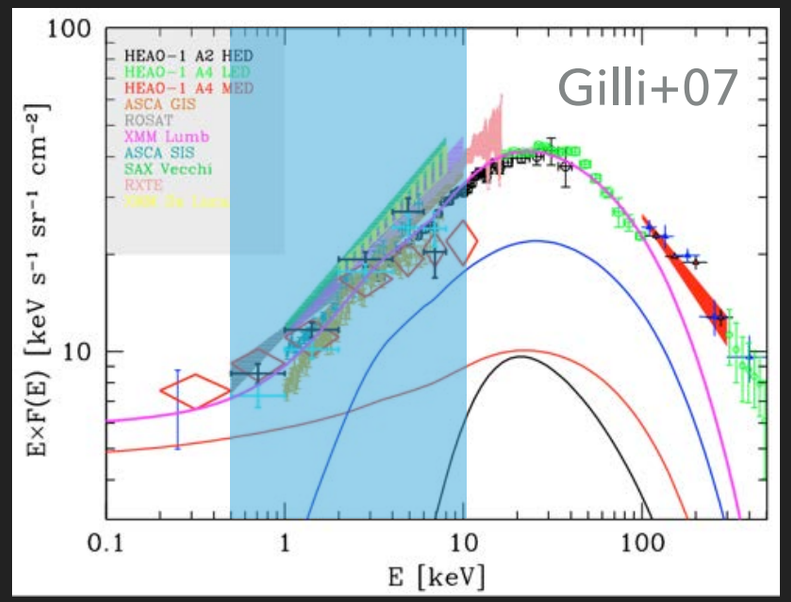
CURRENT PROBLEMS



¡¡ 1869h (6.727Ms) !!

Completeness (%)	$f_{0.5-7keV}$ (erg cm^{-2} s^{-1})
90	2.1×10^{-15}
80	9.1×10^{-16}
50	2.0×10^{-16}
20	5.9×10^{-17}

B.Luo+17 (fig.6)



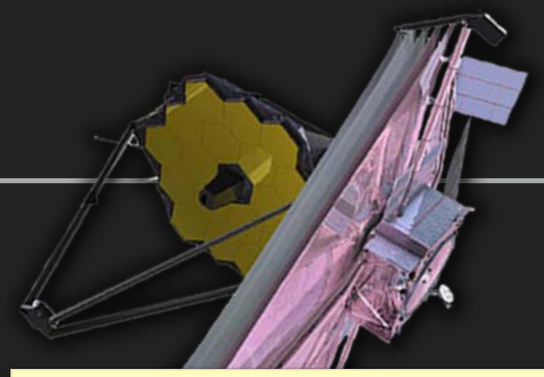
CURRENT PROBLEMS

- *Spitzer* and WISE coarse spatial resolution
- IR high-resolution only in the more local systems

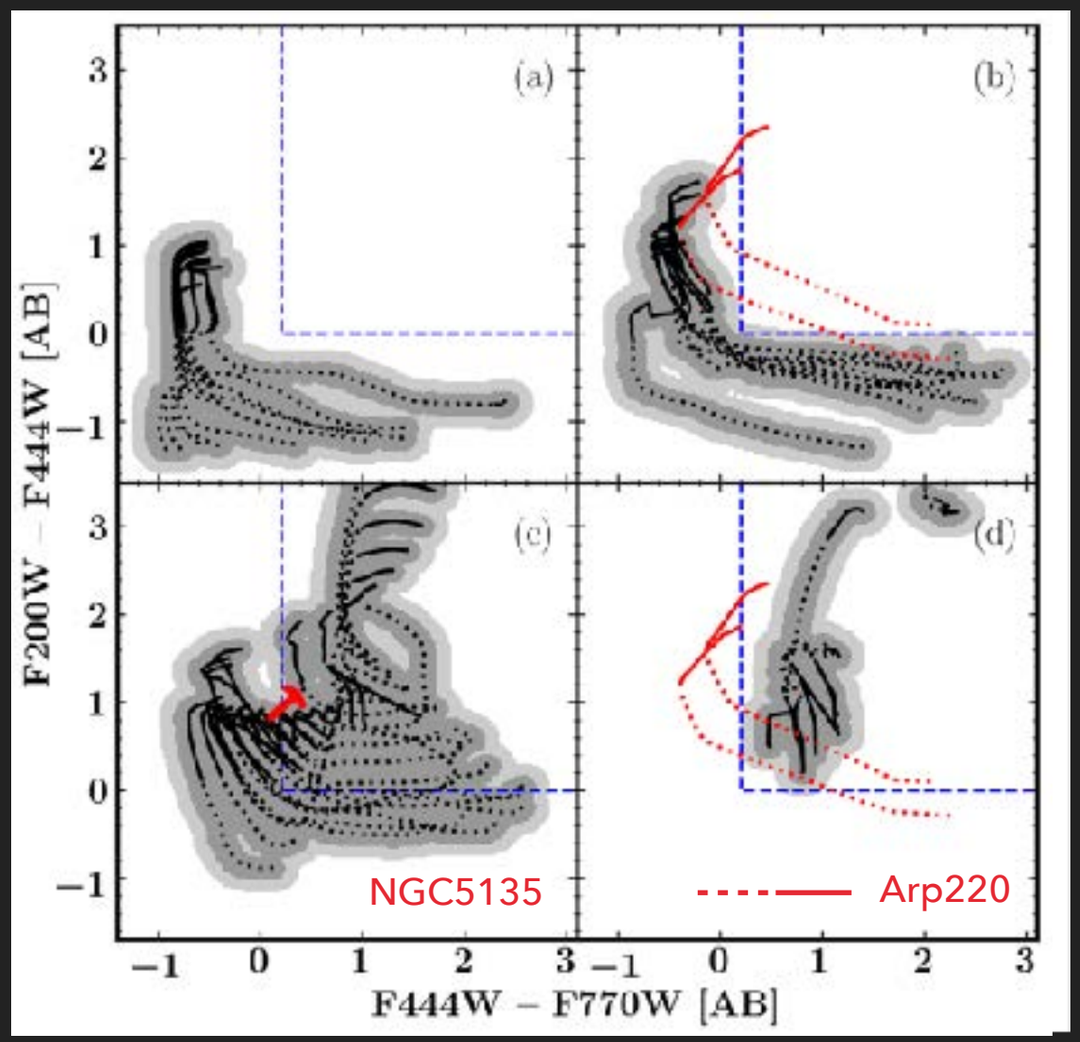
… SO …

DO WE NEED SPECTROSCOPY TO DETECT INTERMEDIATE LUMINOSITY DUSTY AGN?

(e.g., Veilleux+09, Alonso-Herrero+11&12)



ADDRESSING THESE PROBLEMS WITH JWST



(a) early/late ; (b) pure-starburst ;
(c) starburst+AGN ; (d) pure-AGN
NGC5135@z=2.3 – total-vs-2kpc
Arp220 – 1 and 2kpc

- three filters for 0<
  2.0, 4.4, 7.7μm
- high-spatial resol
  ~1kpc @7.7μm @

factsheet:
NGC5135 [Alonso-Herrero+12, Singh+12, Sabatini+17]
– CT AGN with L_{INT}[2-10keV]~1.8E43 erg/s
– SED dominated by host (f_{AGN}~0.4@6um)

Arp220 [Scoville+17, Barcos-Muñoz+18]
- CT nuclear starburst
- AGN in western nucleus?

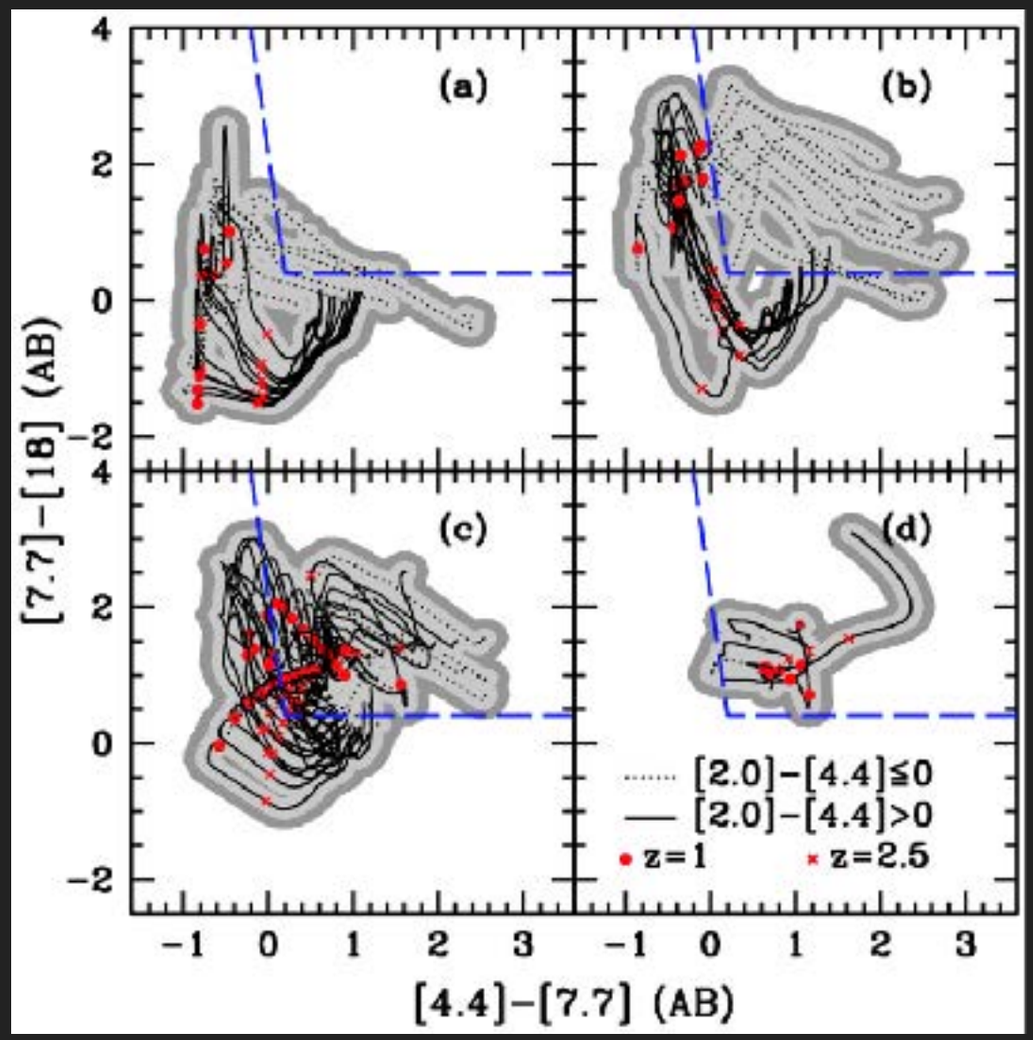
ULIRGs (L_{IR}>1E12$L_{\odot}$) => 0.0064/arcmin^2 [Gruppioni+13]

ngc5135 @V.Singh+12
Suzaku 0.5-50keV observations
comptonThick - NH ~ 2.5e24/cm2
Lint[2-10keV] ~ 1.8e43 erg/s
¿ Lint[0.5-10keV] ~ 2.5e43erg/s ?

ngc5135@Sabatini+17
fig1 - sed dominated by host

ngc5135@Alonso-Herrero+12
agn contribution @6um ~0.4

ADDRESSING THESE PROBLEMS WITH JWST



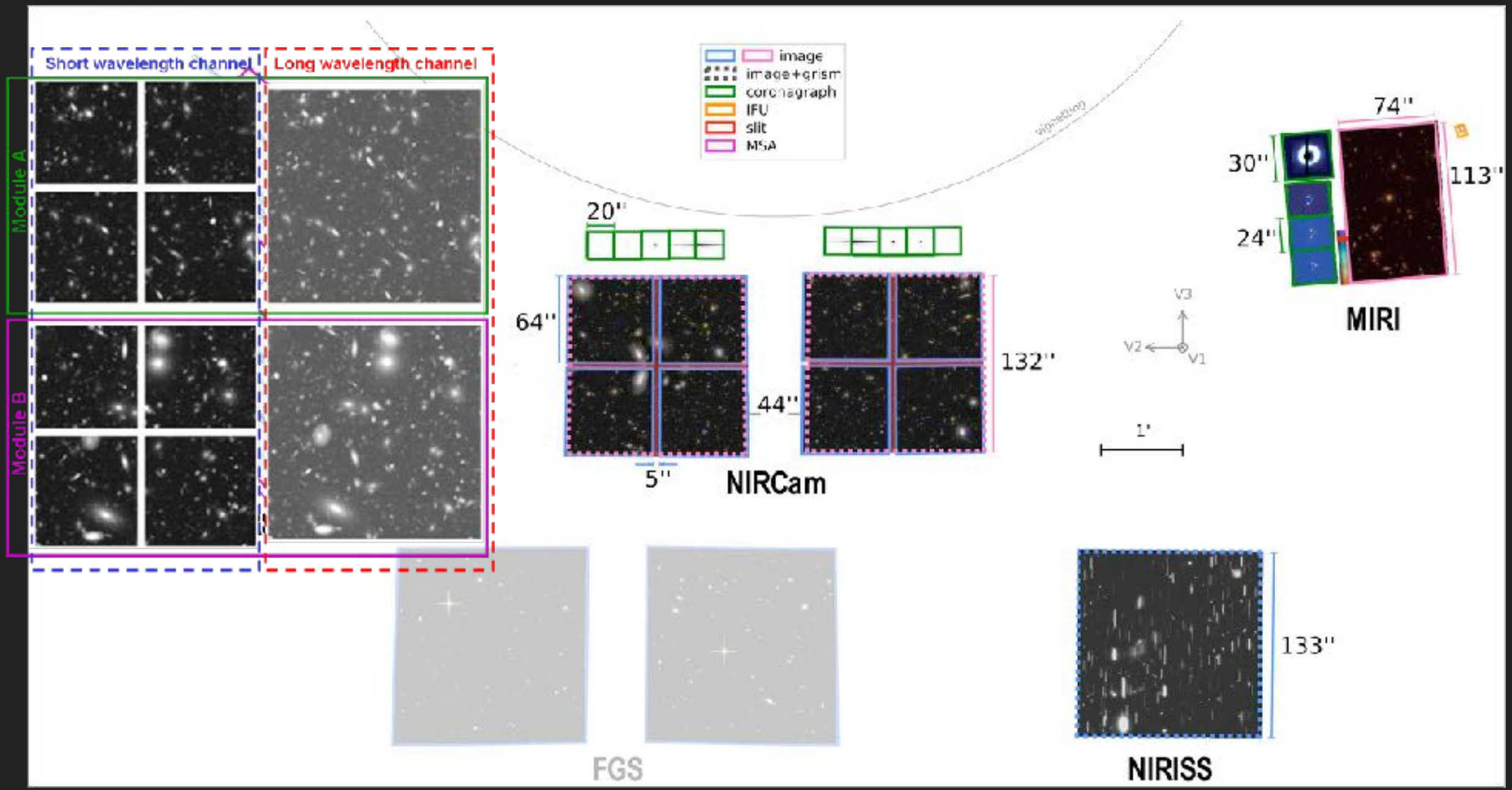
Messias+12/14

- three filters for 0<z<2.5
  2.0, 4.4, 7.7μm
- high-spatial resolution
  ~1kpc @7.7μm @z~2
- four filters for 0<z<6
  2.0, 4.4, 7.7, 18μm
  (GTO-JADES and ERS-CEERS => ~40arcmin² MIRI)

Simulation	Durham	Eagle	Horizon	Illustris	MassiveBlackII	Munich	Aird+15		
#AGN/arcmin²	0.20	0.22	2.97	0.95	0.09	0.04	thin	obs	CT
							0.06	0.17	0.06

Number of AGN per arcmin² with L_X>1E43 erg/s at z<2

ADDRESSING THESE PROBLEMS WITH JWST



CONCLUSIONS / EXPECTATIONS / NEEDS

- JWST depth and spatial-res capabilities to the rescue
- L_X>1e43erg/s AGN can be selected with low contamination
- GTO/ERS proposals have the filters, but lack MIRI area z<2
- need for multi-wl/non-JWST information too (eg, z_{phot}, AGN properties, ...) for improved characterization
- host morphology as an extra
- many other science cases addressed with such data-set