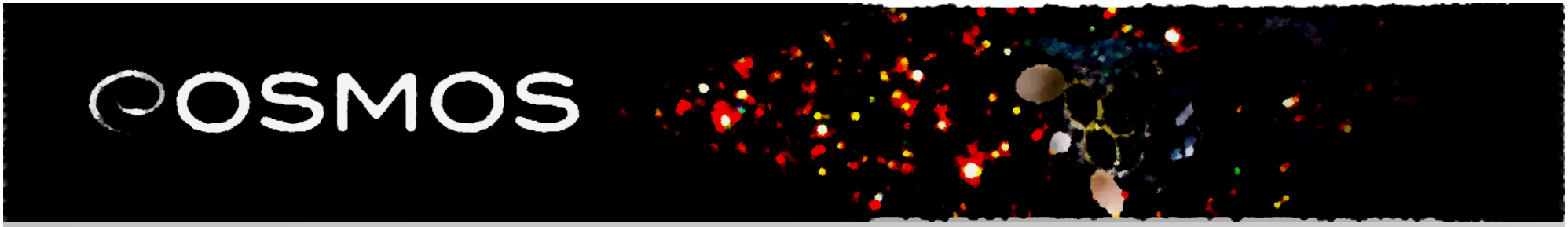
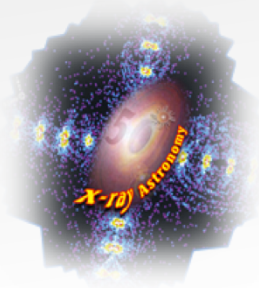
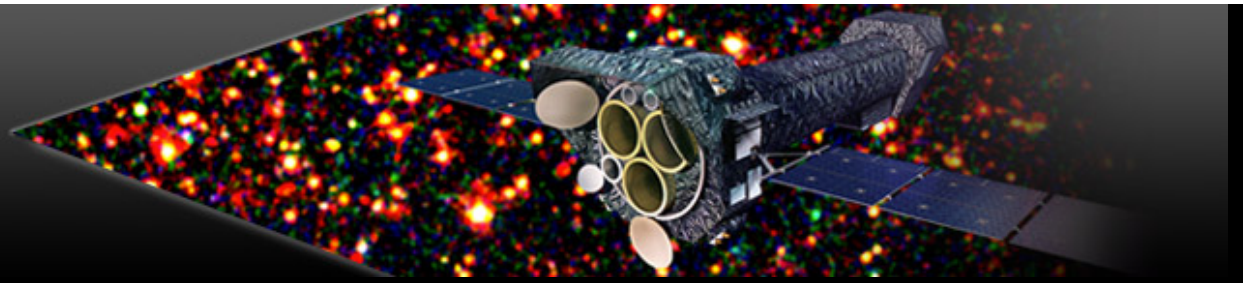


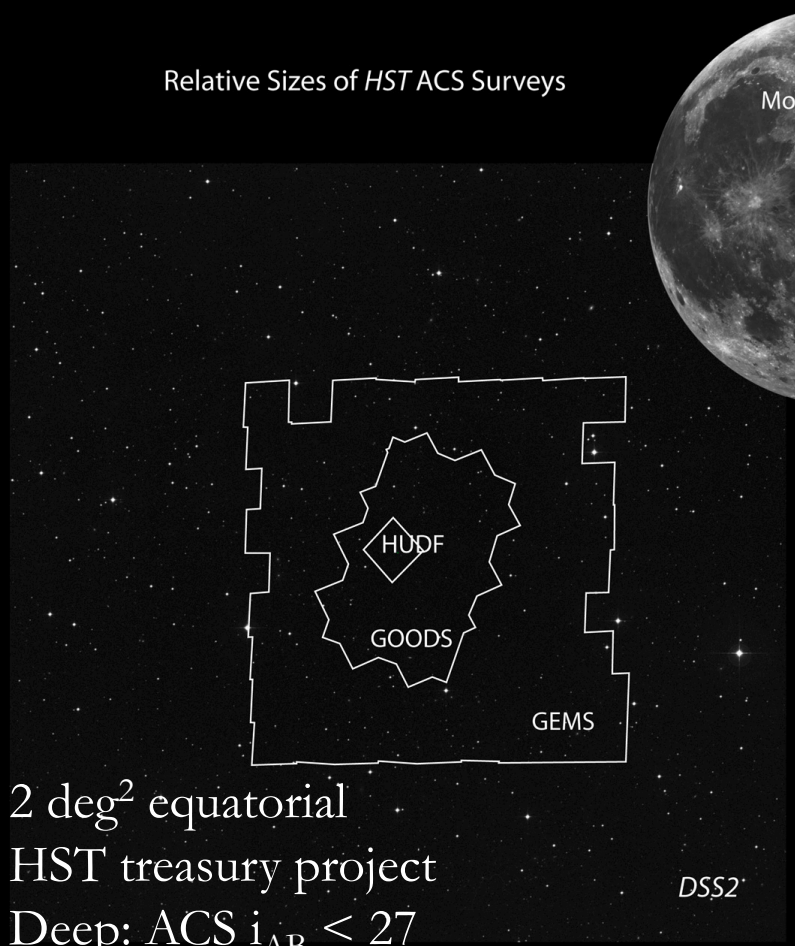
Accreting SMBH in the COSMOS field: the connection to their host galaxies

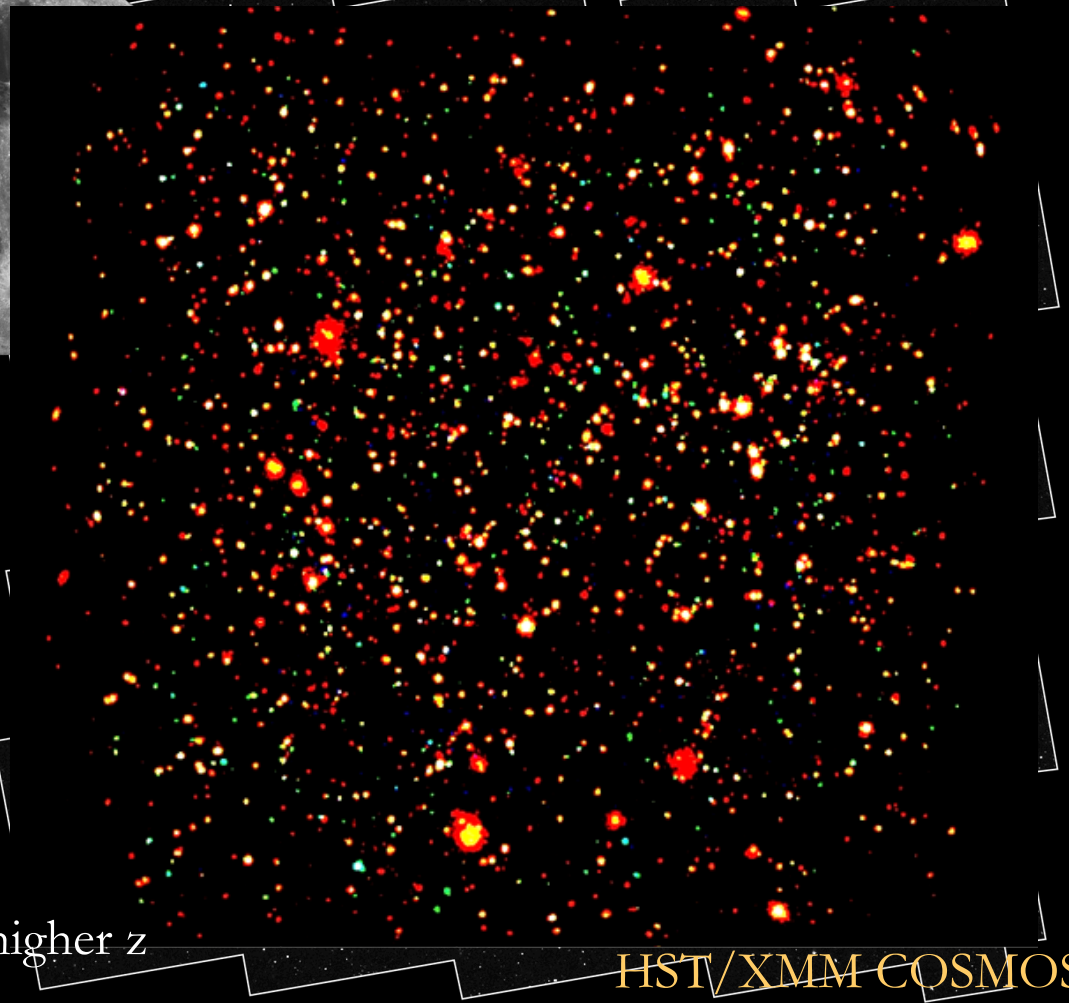
Bongiorno, Merloni, et al., 2012,
MNRAS, in press.
arXiv:1209.1640



COSMOS







2 deg^2 equatorial
HST treasury project
Deep: ACS $i_{AB} < 27$
Similar volume ~~as SDSS, but fainter~~ and higher z
Extensive multi- λ coverage

HST/XMM COSMOS
[Scoville, Hasinger]

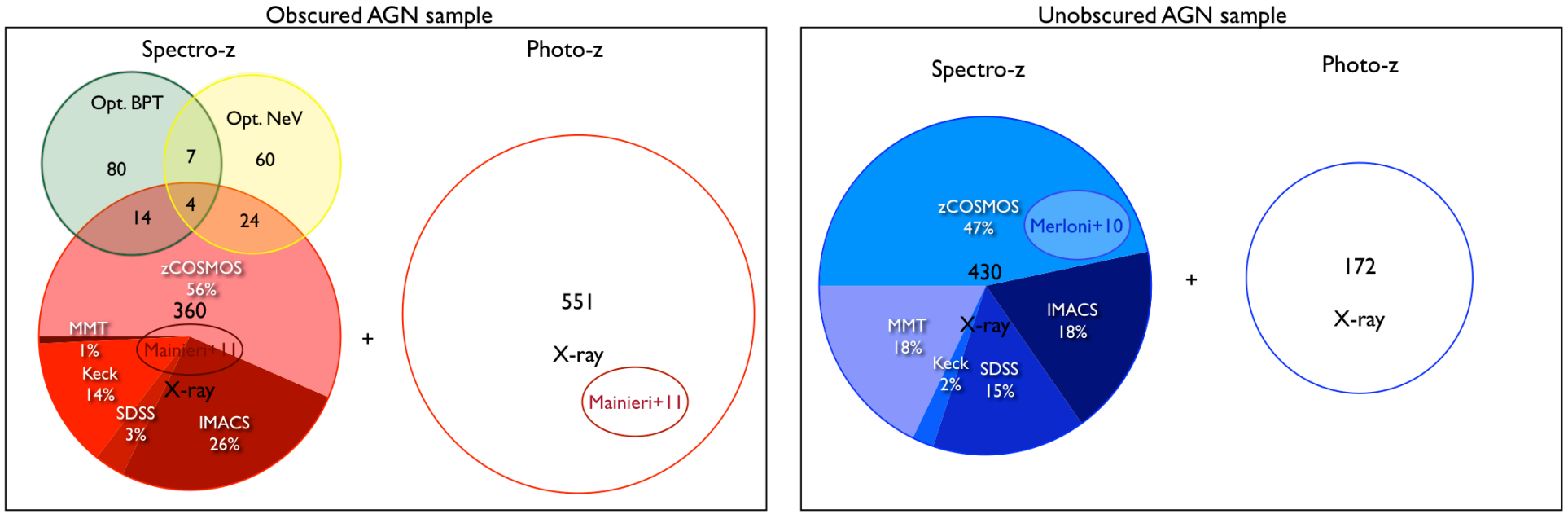
Scientific Questions

- Statistically robust assessment of AGN demographics:
  - Which galaxies host (which) AGN?
  - AGN triggering: under which conditions do SMBH grow?
- Does AGN activity affect galaxies' properties (at the population level)
  - Location of AGN in color-magnitude plots, etc.
  - Smoking guns of AGN feedback?

See e.g. Nandra et al. 2008; Silverman et al. 2009; Brusa et al. 2010; Xue et al. 2011; Schavinski et al. 2011; Rosario et al. 2012; Alexander & Hickox 2012; Mullaney et al. 2012; Santini et al. 2012; Page et al. 2012; Rovilos et al. 2012; Harrison et al. 2012; etc.

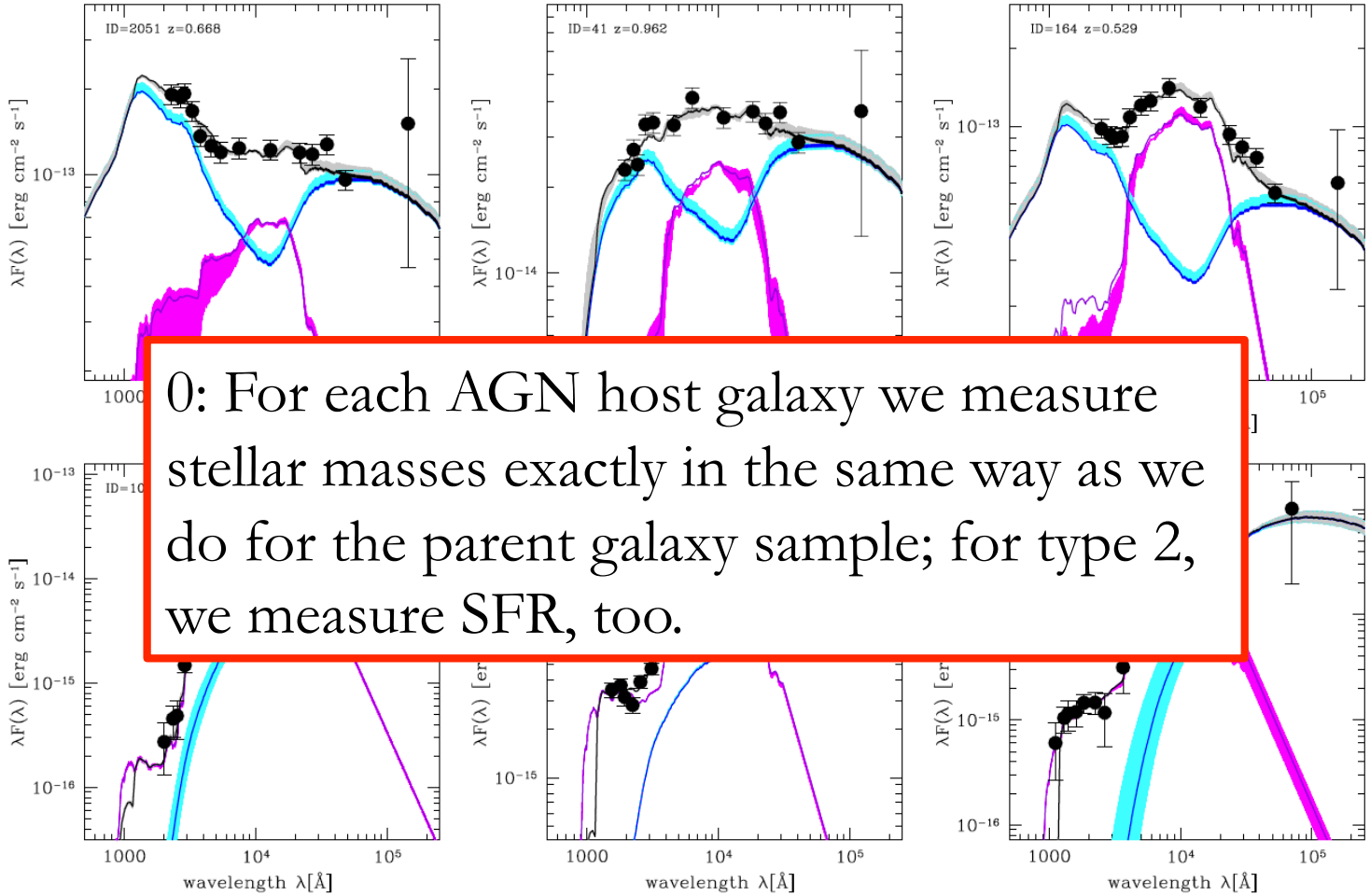
A complete, X-ray selected, AGN sample

- 1555 X-ray selected AGN (XMM; f_{lim}~ **5×10^{-16}**[0.5-2]; **3×10^{-15}**[2-10])
- **100% redshift complete** (54% specz; 46% photoz)
- 602 Unobscured (71% specz; 29% photoz)
- 953 Obscured (42% specz; 58% photoz)
- **Parent sample** of ~200k IRAC galaxies (photoz, M_*; Ilbert et al. 2010)



See also Brusa et al. 2010; Salvato et al. 2009; Lusso et al. 2011, 2012

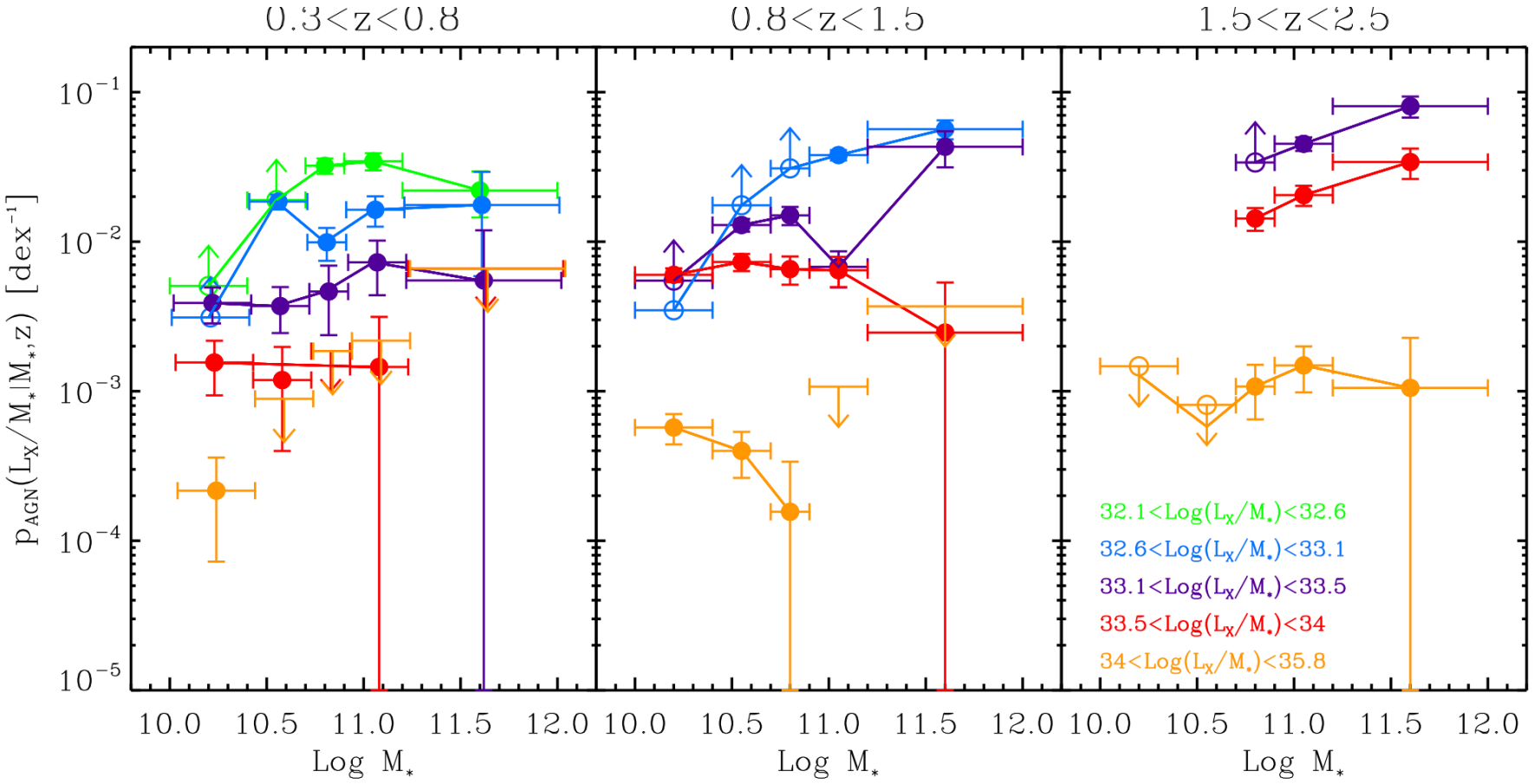
Optical/NIR SED decomposition



0: For each AGN host galaxy we measure stellar masses exactly in the same way as we do for the parent galaxy sample; for type 2, we measure SFR, too.

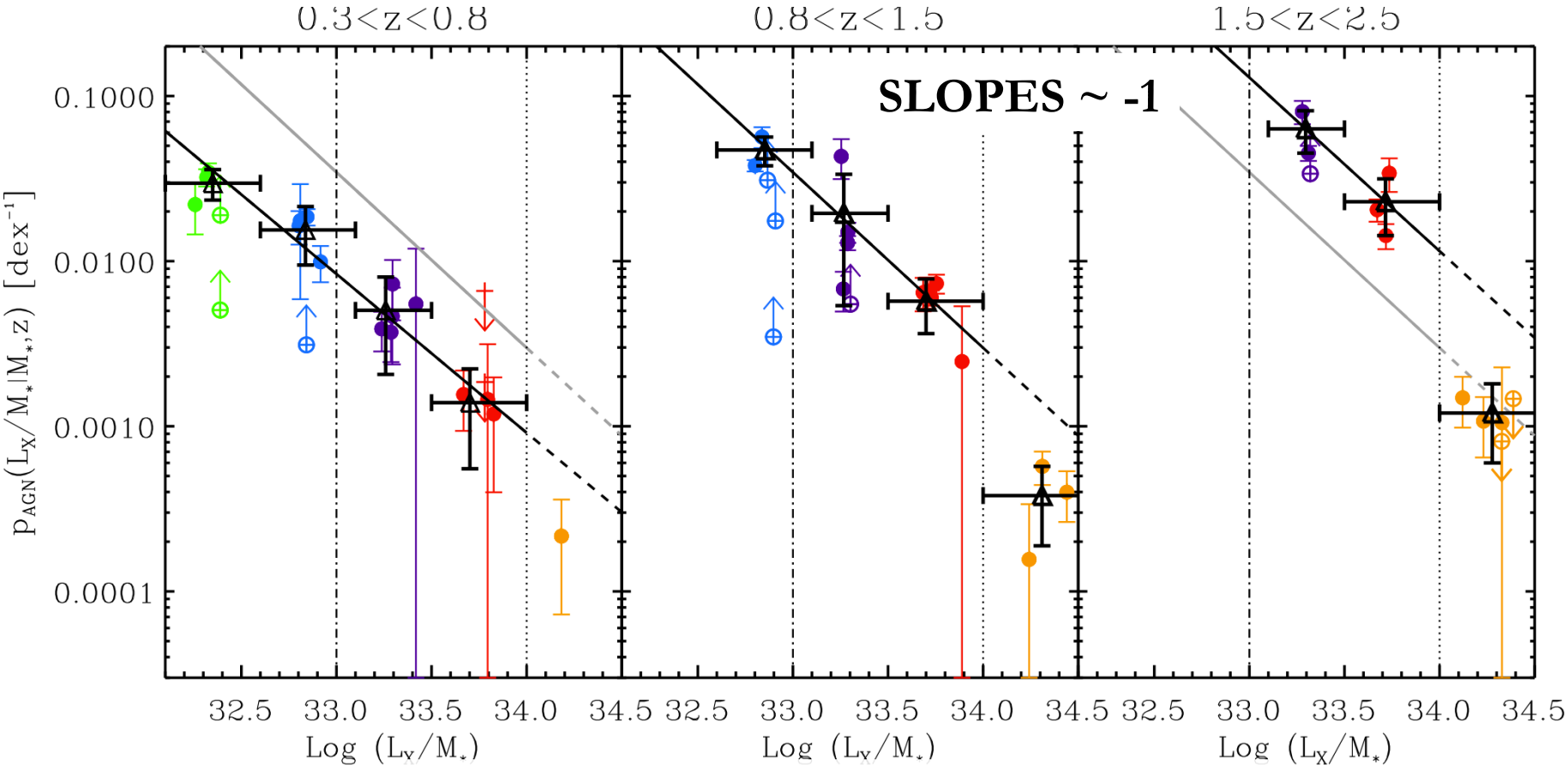
- Rest-Frame 12 μ luminosity assumed to come from AGN (proxy for L_{bol})
- SFR estimates from optical/UV SED: lack a full IR modelling of SF

AGN fractions f(M_*, L_X/M_*)



1: The probability of a galaxy to host an AGN growing at a given specific accretion rate is (almost) **independent of stellar mass**

AGN fraction f(M_*, L_X/M_*)

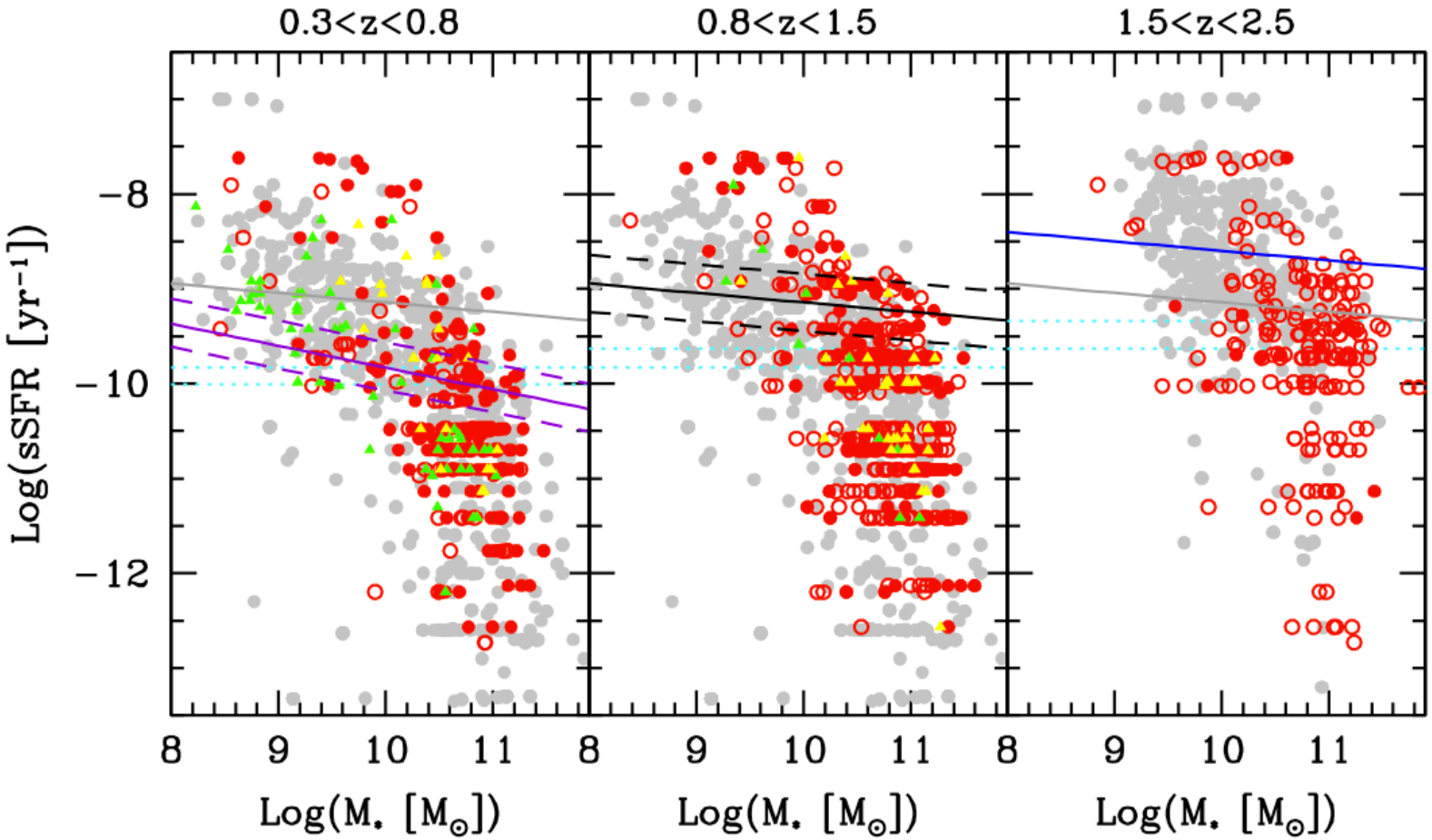


"Specific Accretion rate" (Aird et al. 2012)

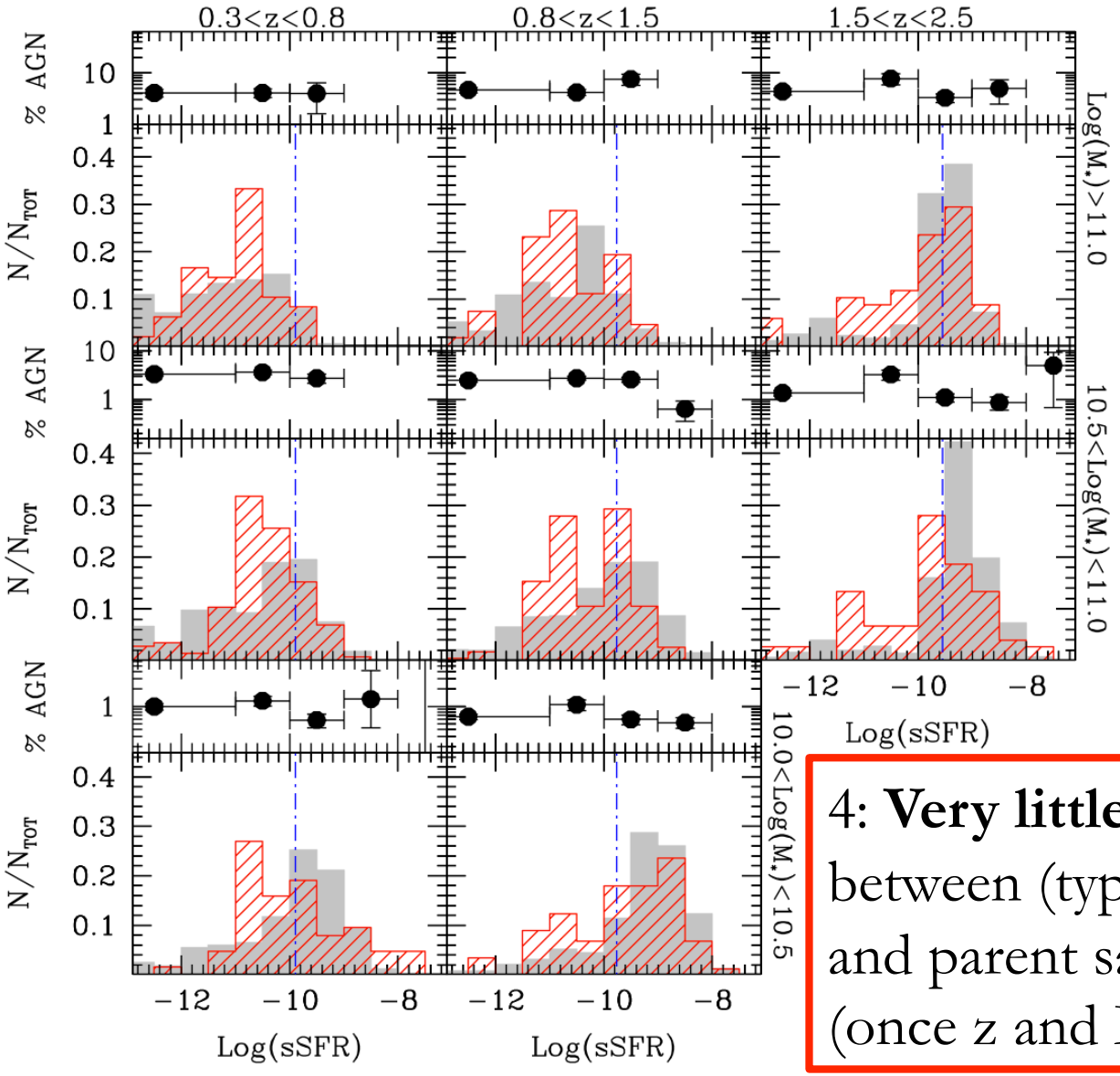
2: Its normalization increases as **~(1+z)^4** [cfr. sSFR density]

3: There appears to be a break consistent with **~Eddington limit**

Obscured AGN in sSFR-Mass plane



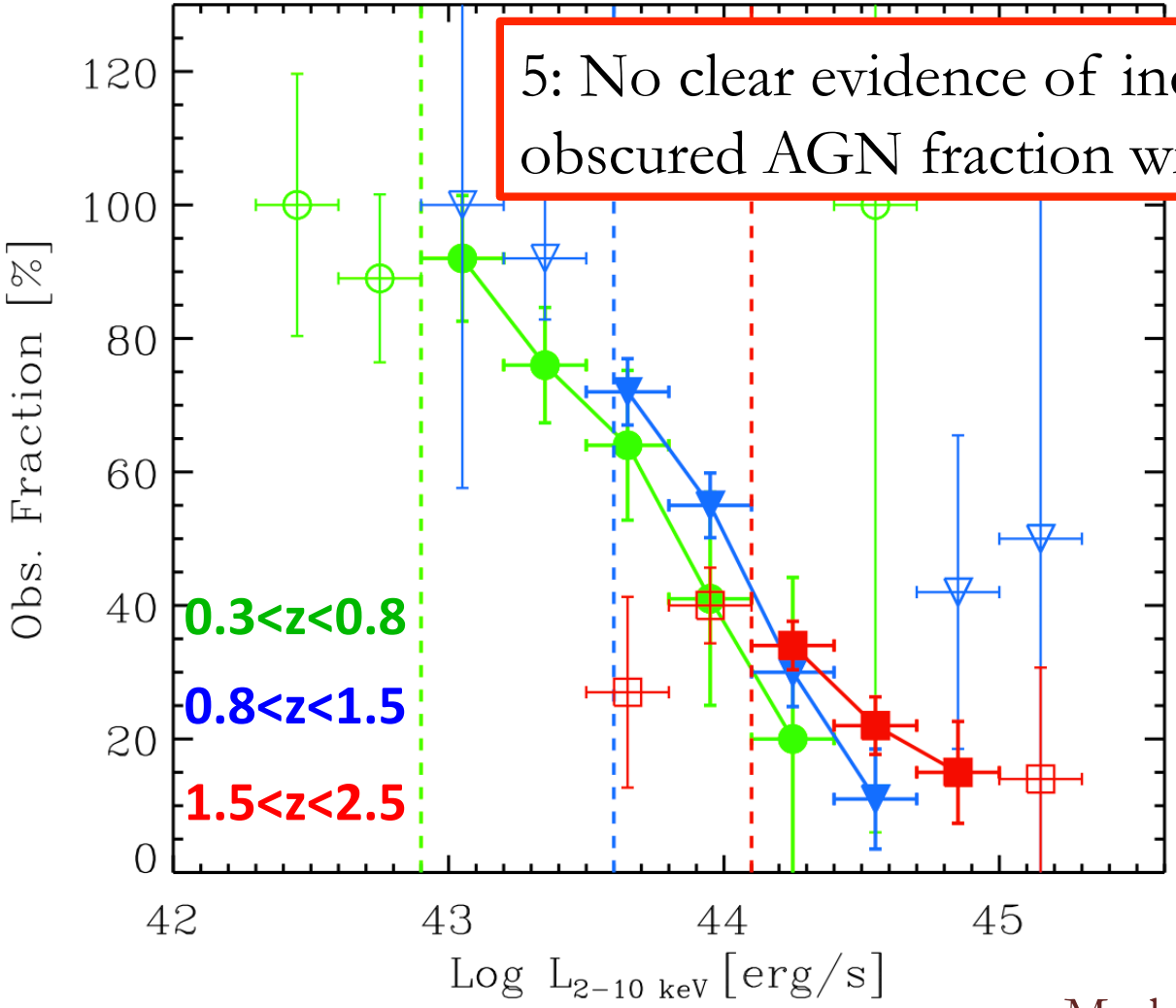
Obscured AGN in sSFR-Mass plane



4: **Very little difference** between (type 2) AGN hosts and parent sample in sSFR (once z and M_* factored out)

AGN obscuration: redshift dependence?

Using the redshift info, and the observed count rates, we extracted complete, **rest-frame 2-10 keV selected** sample ($f_{2\text{-}10}>1.8\times10^{-15}$; no N_H-z bias)

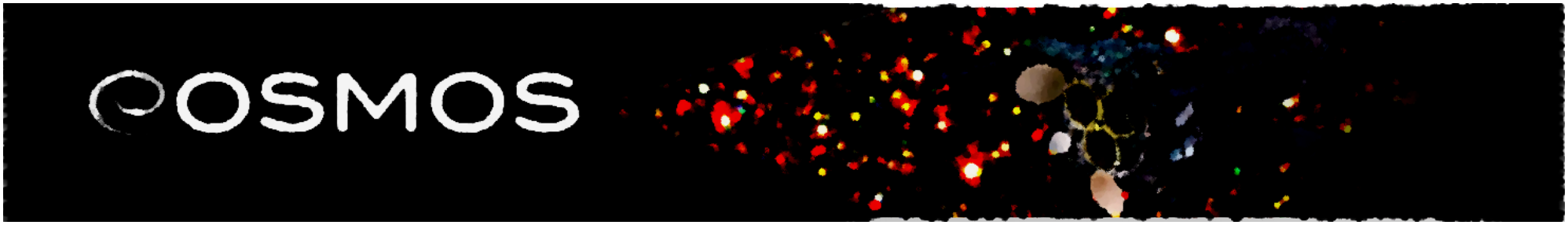


5: No clear evidence of increase of obscured AGN fraction with redshift

Merloni et al., in prep.

Conclusions

1. The probability of a galaxy to host an AGN growing at a given specific accretion rate is (almost) **independent of stellar mass**
2. AGN fraction normalization increases **~(1+z)^4** [~sSFR density]
3. The AGN fraction distribution shows a break consistent with **Eddington limit**
4. Very little difference between (type 2) AGN hosts and parent sample in sSFR (once z and M_* factored out). **Where is AGN feedback smoking gun? ($t_{AGN} \not> t_{quench}$)**
5. In carefully selected (2-10 keV rest-frame) samples, no clear evidence of increase of obscured AGN fraction with redshift
6. We are **limited by statistics**! To sample well L_X, z, M_*, N_H, SFR we need > 10,000 objects (eROSITA!)



Thank you!

Bongiorno, Merloni, et al., 2012,
MNRAS, in press.

arXiv:1209.1640