The Host-galaxy Properties of Type 1 versus Type 2 AGNs

Zou et al. (2019)

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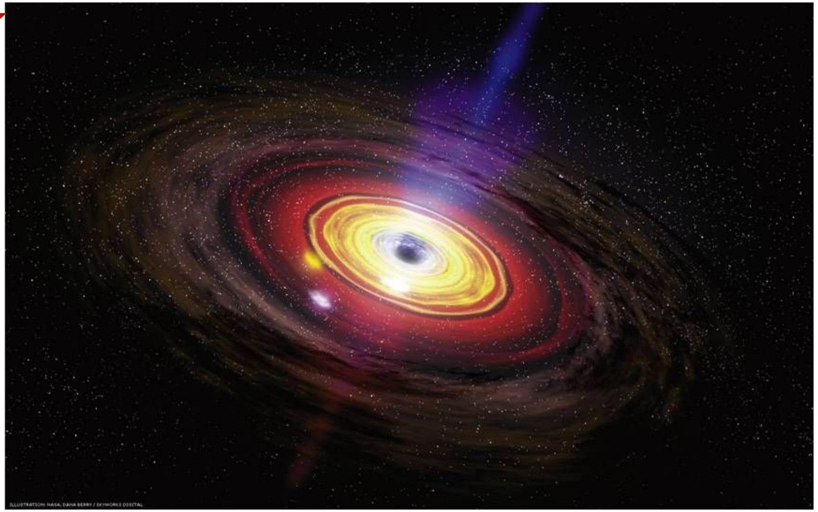
Outline

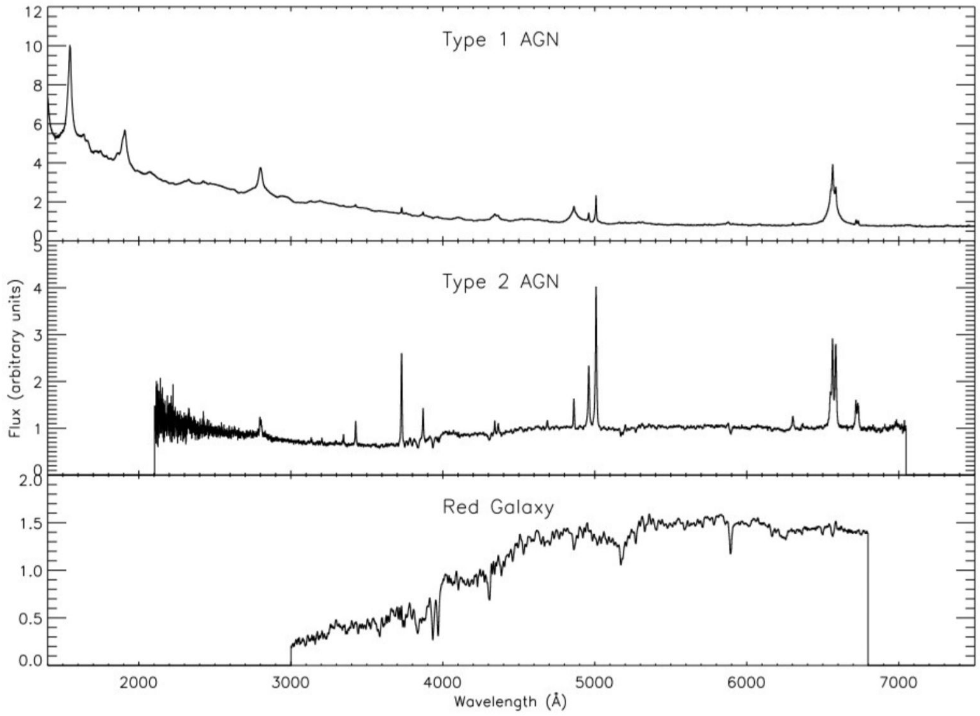
1. Introduction
2. Data Analyses and Results
3. Conclusions

Introduction: Active Galactic Nuclei (AGNs)

NGC 1097



Optical Spectral Types of AGNs



Type 1 AGN

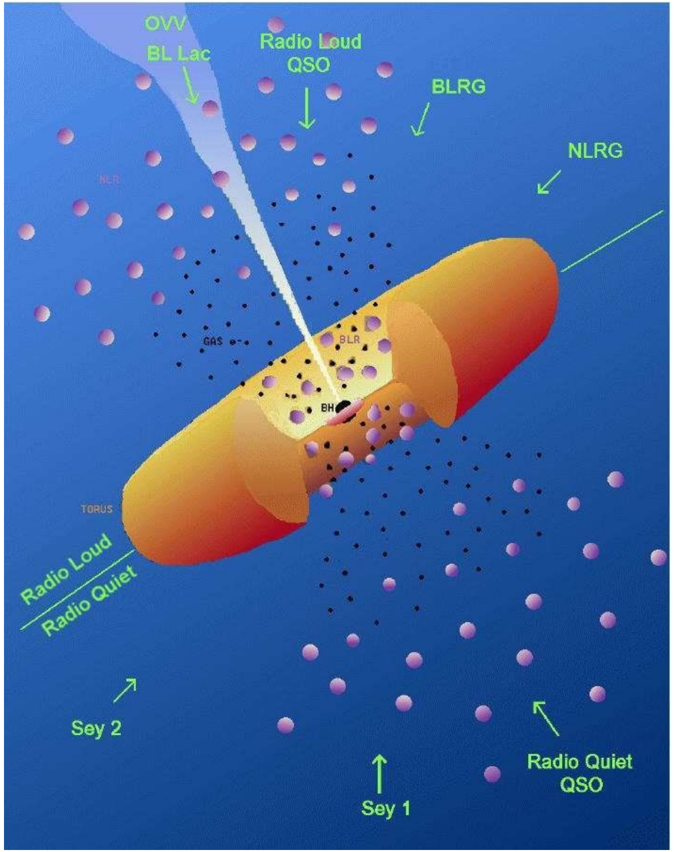
Type 2 AGN

Red Galaxy

The Unified Model

AGN type is only due to viewing angle with respect to torus

Prediction: host-galaxy properties should be similar for type 1 and type 2 AGNs



Urry & Padovani (1995)

Merger-Trigger Model

Galaxy merger can trigger AGN & star formation

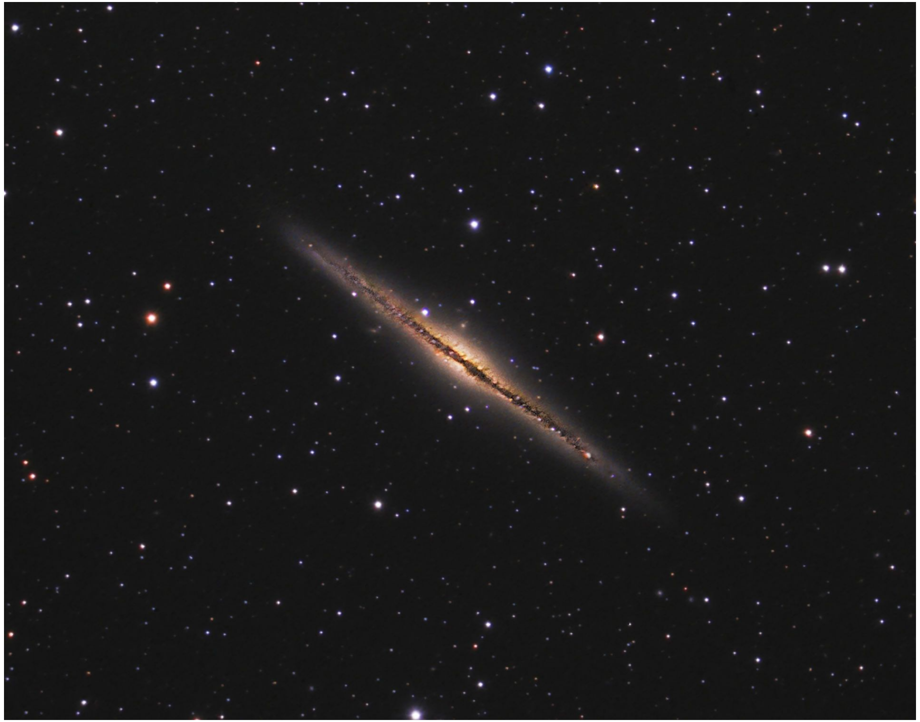
Evolution:

1. type 2 AGN & high SFR
2. type 1 AGN & low SFR

Galactic-Obscuration Model

Galactic-scale obscuration might also obscure AGN

Prediction: type 1 AGNs prefer lower-mass galaxies (less obscuring material)



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4. X-ray Transients

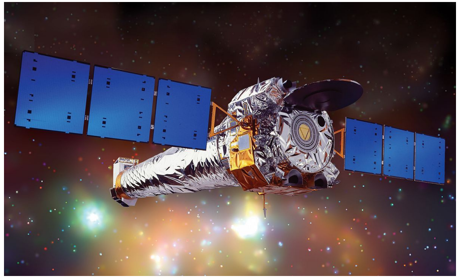
Data: COSMOS-Legacy Survey

2 deg^2 *Chandra* X-ray survey

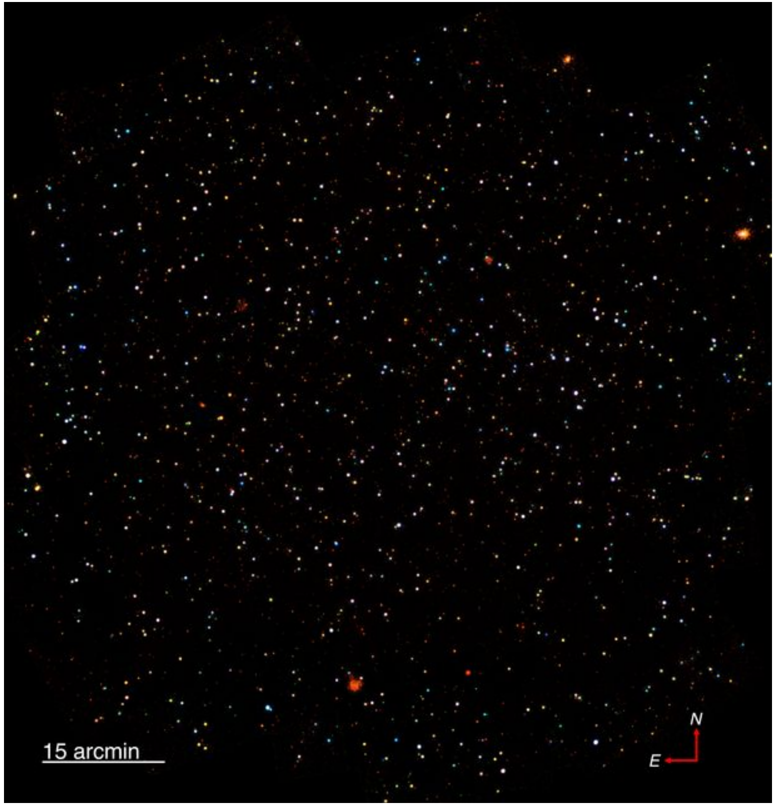
UV-to-FIR Multiwavelength

Intensive Spectroscopic Observation

400 type 1 and 1500 type 2 (z=0.2-4)



Civano et al. 2016



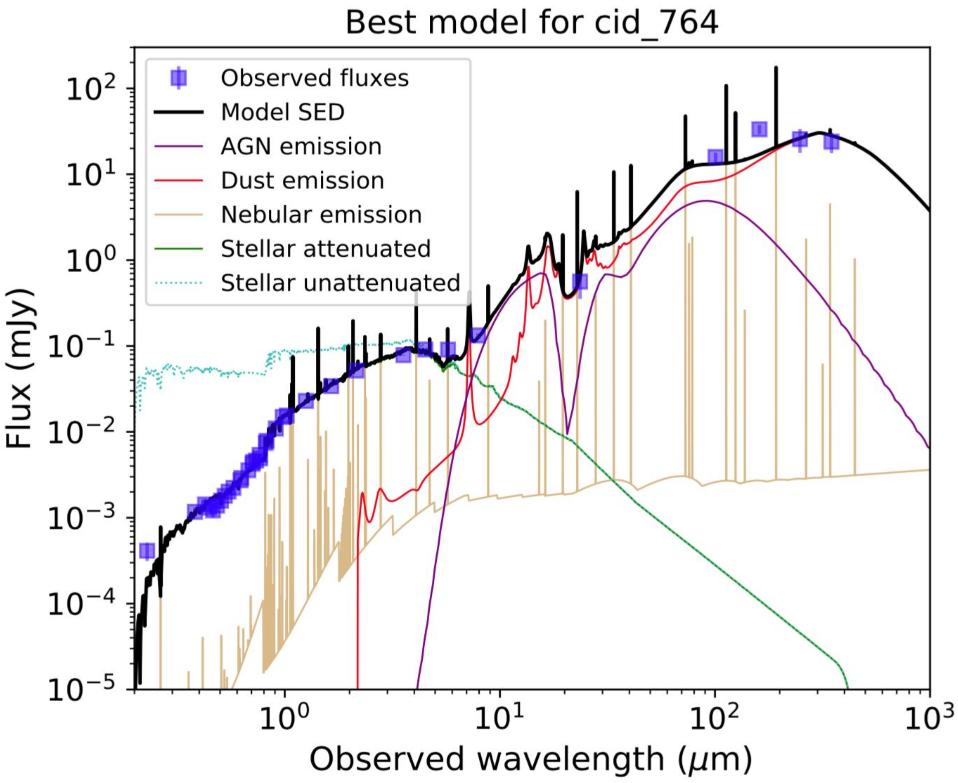
SED fitting: obtaining galaxy properties

Code: CIGALE

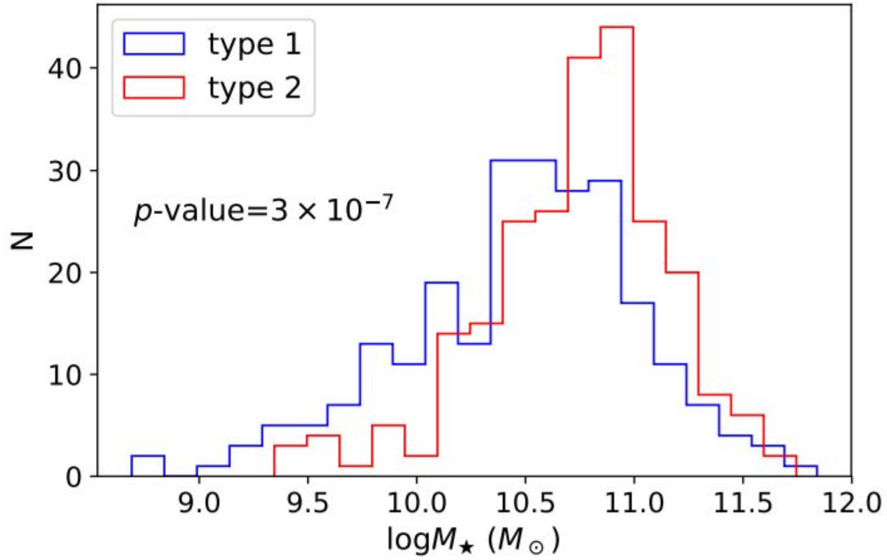
Energy conservation

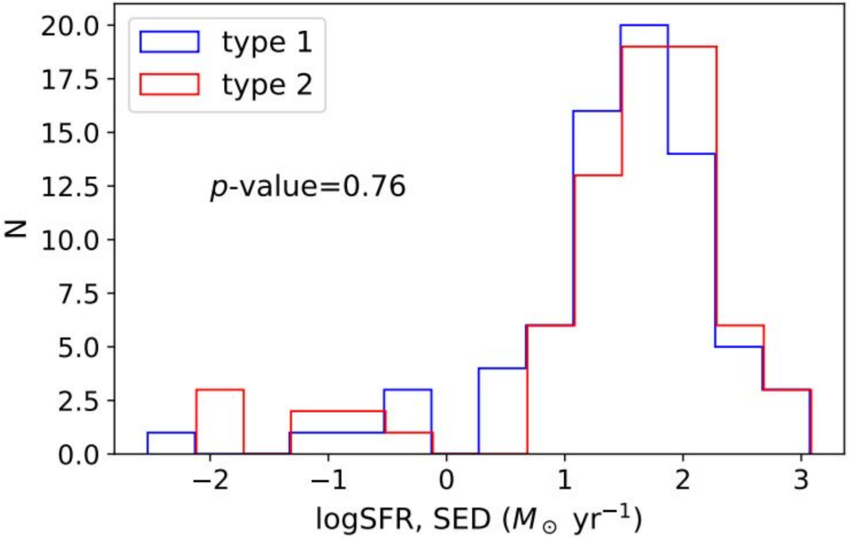
32 photometric bands

Herschel FIR bands (or upper limit) included



SED results

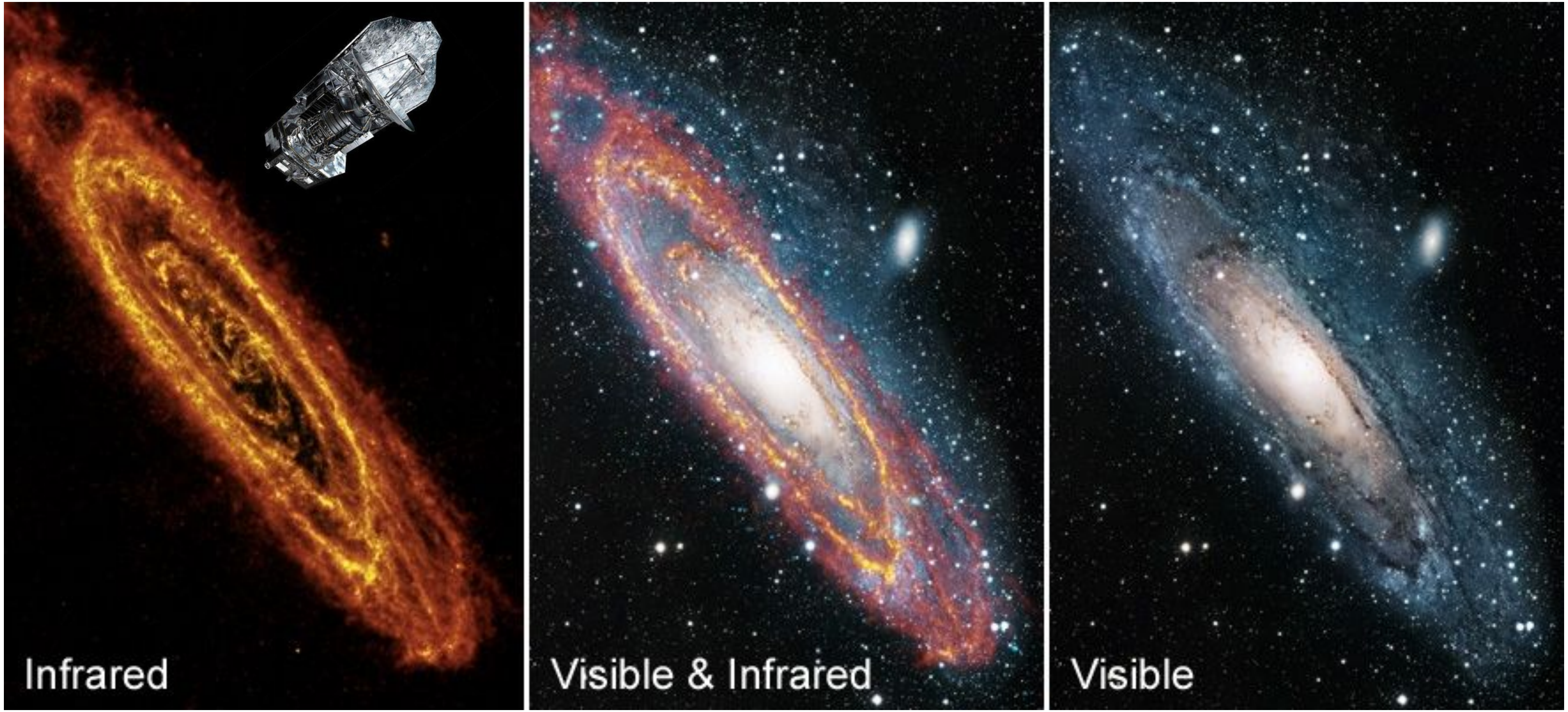




Type 1 have smaller $M_\star$

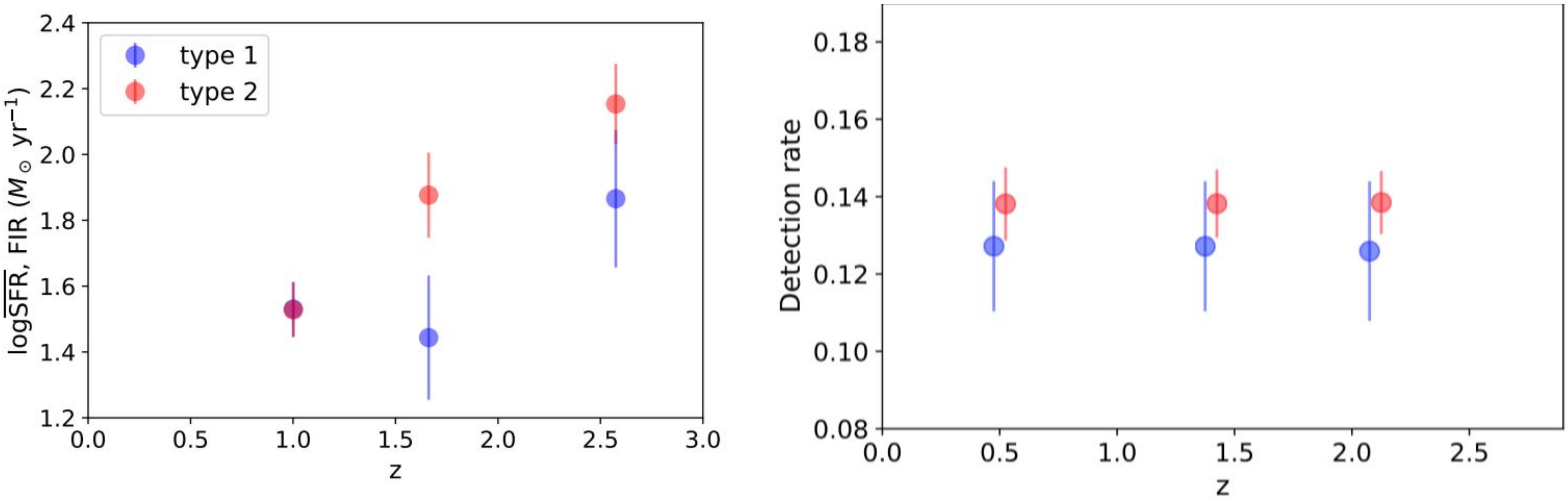
They have similar SFR

Herschel Far-IR flux: another SFR measurement



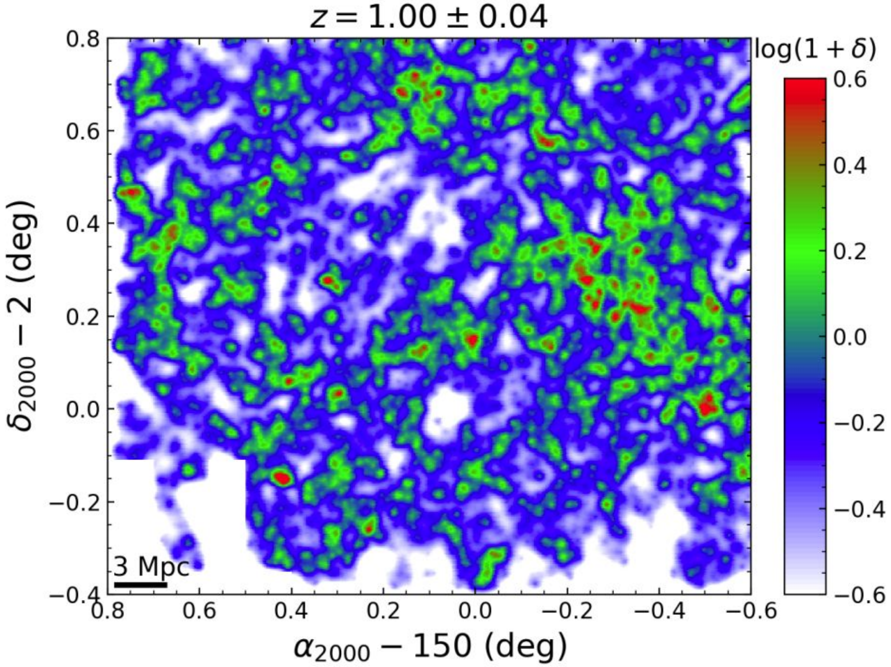
M31

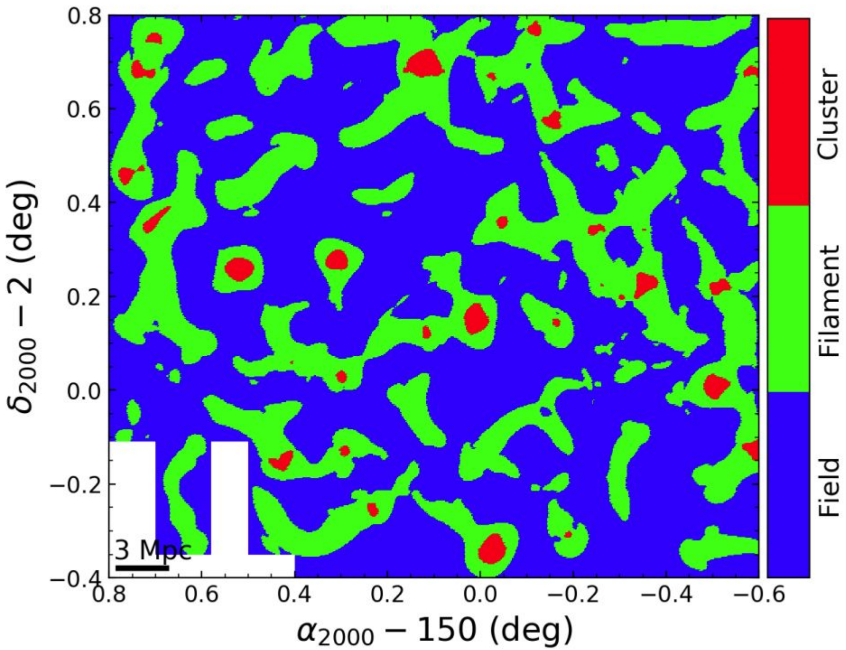
Herschel FIR: detection + stacking



Consistent with SED method, SFRs are similar!

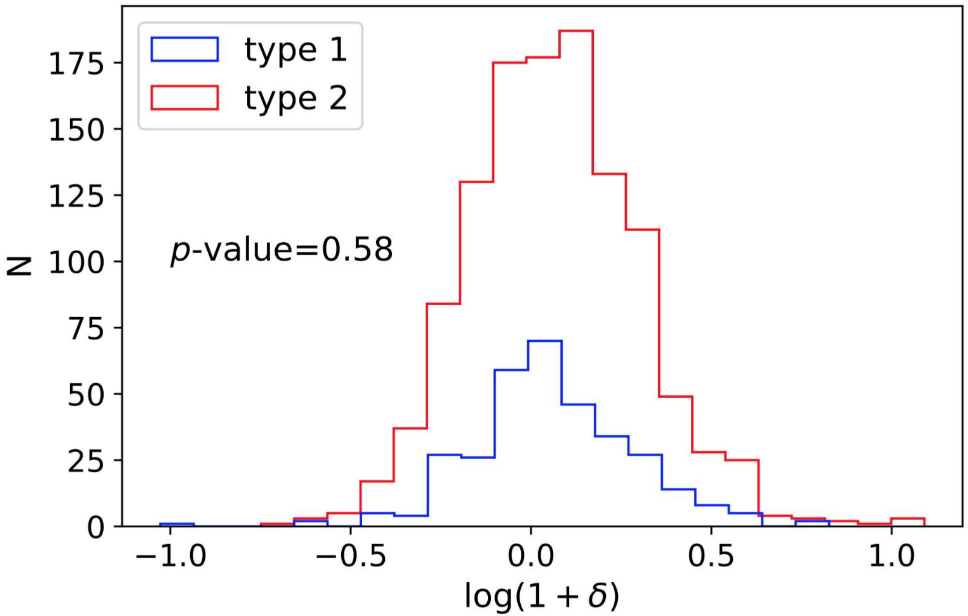
Cosmic environment: measured from z-slices





Yang et al. (2018)

Cosmic environments are also similar!



Redshift range	Fraction	Case 1		
		Type 1	Type 2	Difference
Unlimited	f_{field}	0.45 ± 0.03	0.38 ± 0.03	0.07 ± 0.04
$z > 1.2$	f_{field}	0.53 ± 0.05	0.41 ± 0.04	0.12 ± 0.06
$z < 1.2$	f_{field}	0.35 ± 0.05	0.34 ± 0.04	0.01 ± 0.06
	f_{filament}	0.60 ± 0.05	0.58 ± 0.05	0.03 ± 0.06
	f_{cluster}	0.05 ± 0.02	0.08 ± 0.02	-0.03 ± 0.03

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Conclusions

- We have compared M*, SFR, and cosmic environment for type 1 and type 2 AGNs
- Type 1 has slightly smaller M* than type 2
- The SFR, and environment are similar for type 1 and type 2 hosts
- Our results support AGN unification model + galactic obscuration