

THE DISTRIBUTION OF AGN HOST SFRs



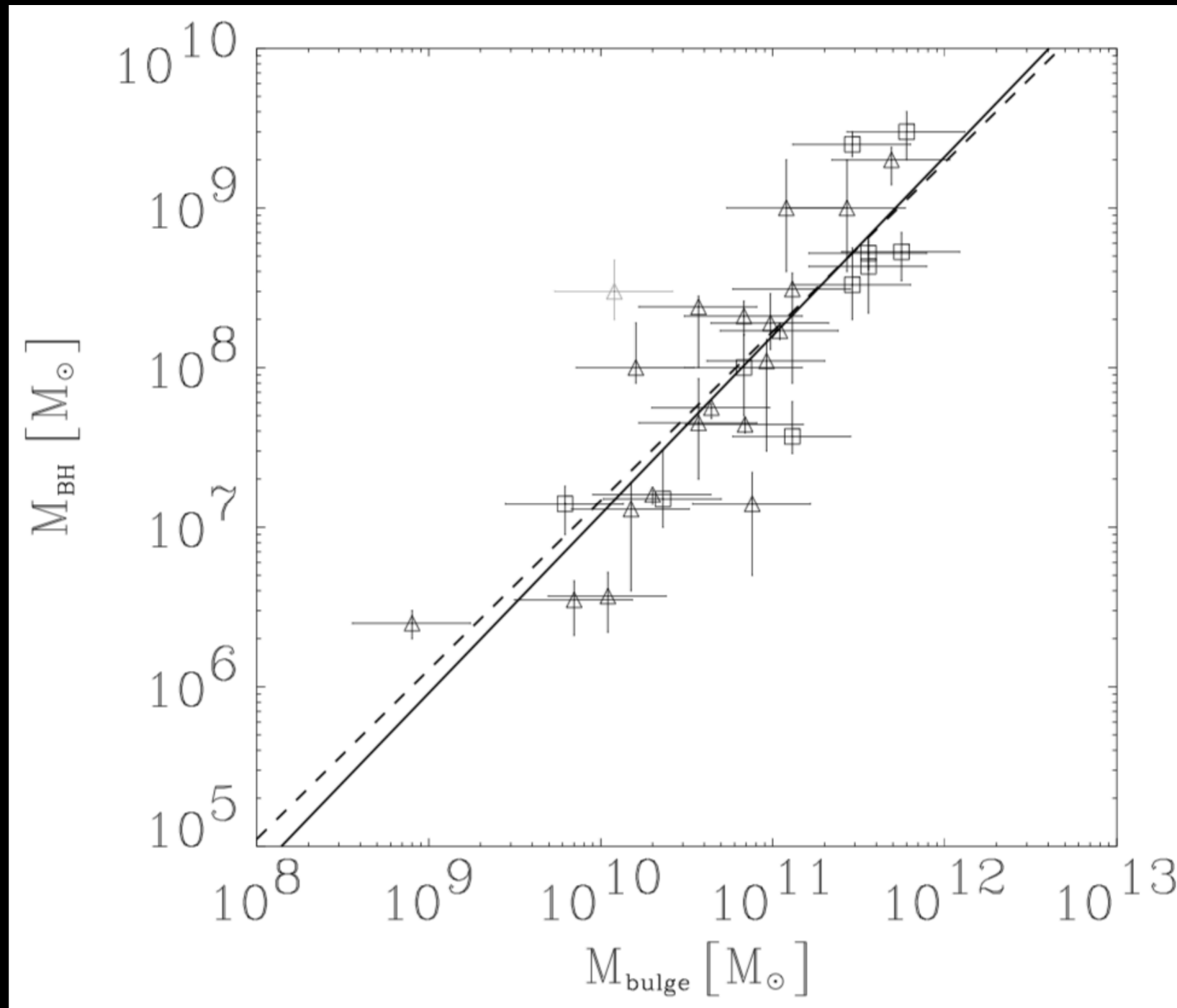
Emmanuel
Bernhard

MORE POWERFUL AGNs RESIDE IN MORE
MS STAR-FORMING GALAXIES

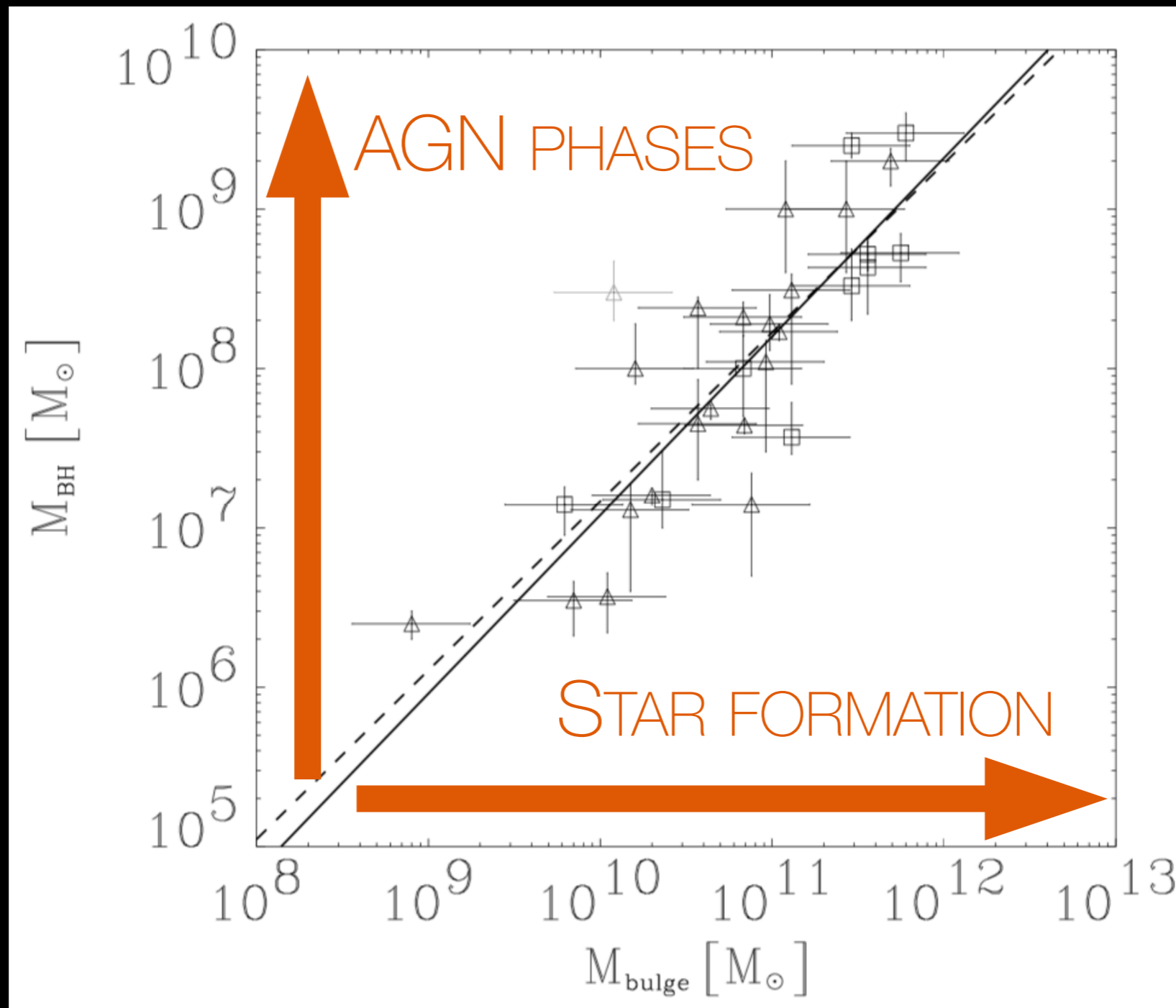
L.P. Grimmer, J. Mullaney, E. Daddi, C. Tadhunter and S. Jin

e.p.bernhard@sheffield.ac.uk

$M_{\text{BH}}-M_{\text{BULGE}}$ SCALING RELATIONSHIP

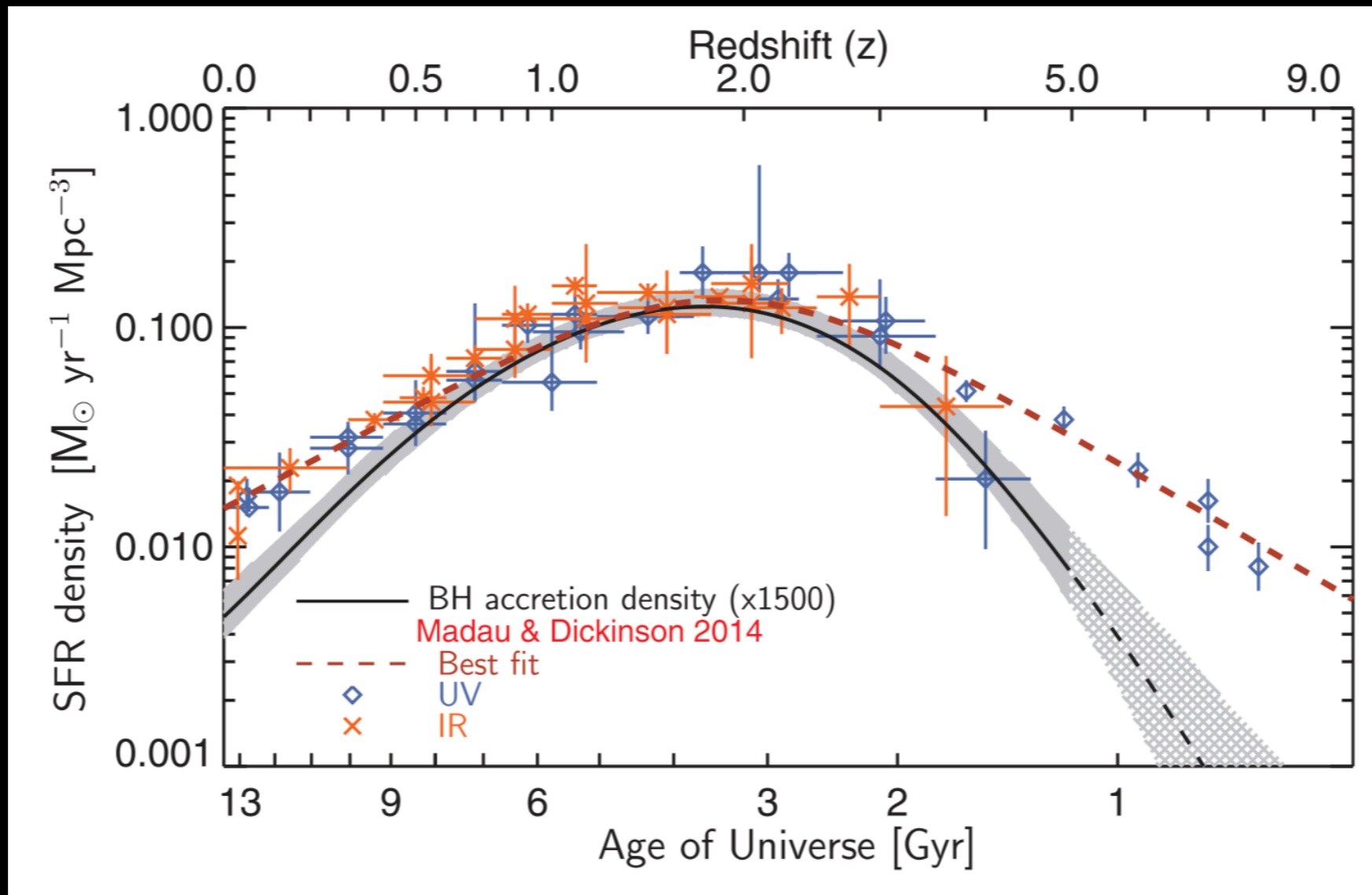


$M_{\text{BH}}-M_{\text{BULGE}}$ SCALING RELATIONSHIP



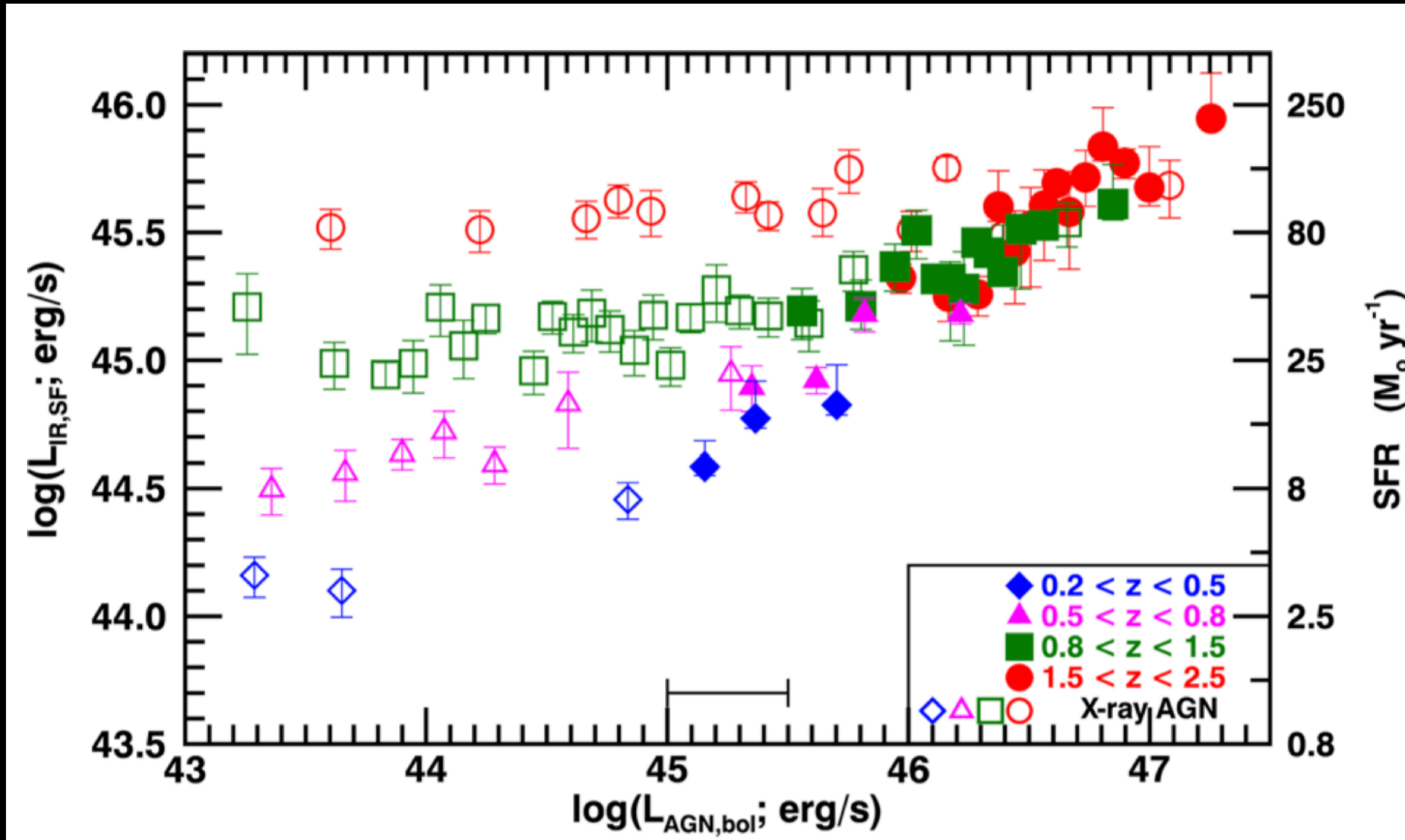
BH-GALAXY CO-EVOLUTION

Aird et al. 2015



Somehow, the way **galaxies** grow via **SF** is **connected** to the way **SMBHs** grow via **accretion**

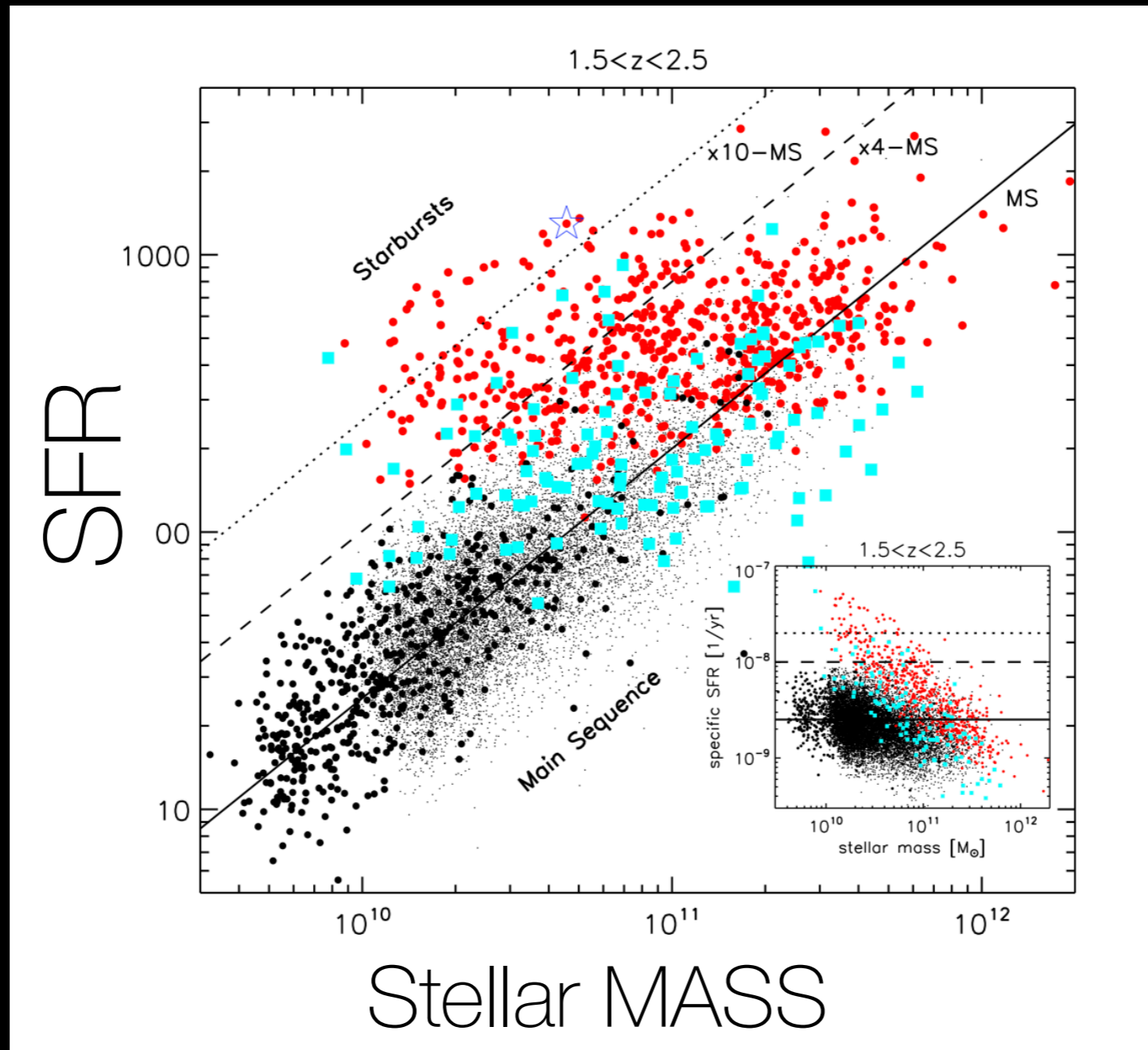
LACK OF RELATIONSHIP BETWEEN AGN POWER AND SFR



Stanley et al. 2018

THE MAIN SEQUENCE OF GALAXIES

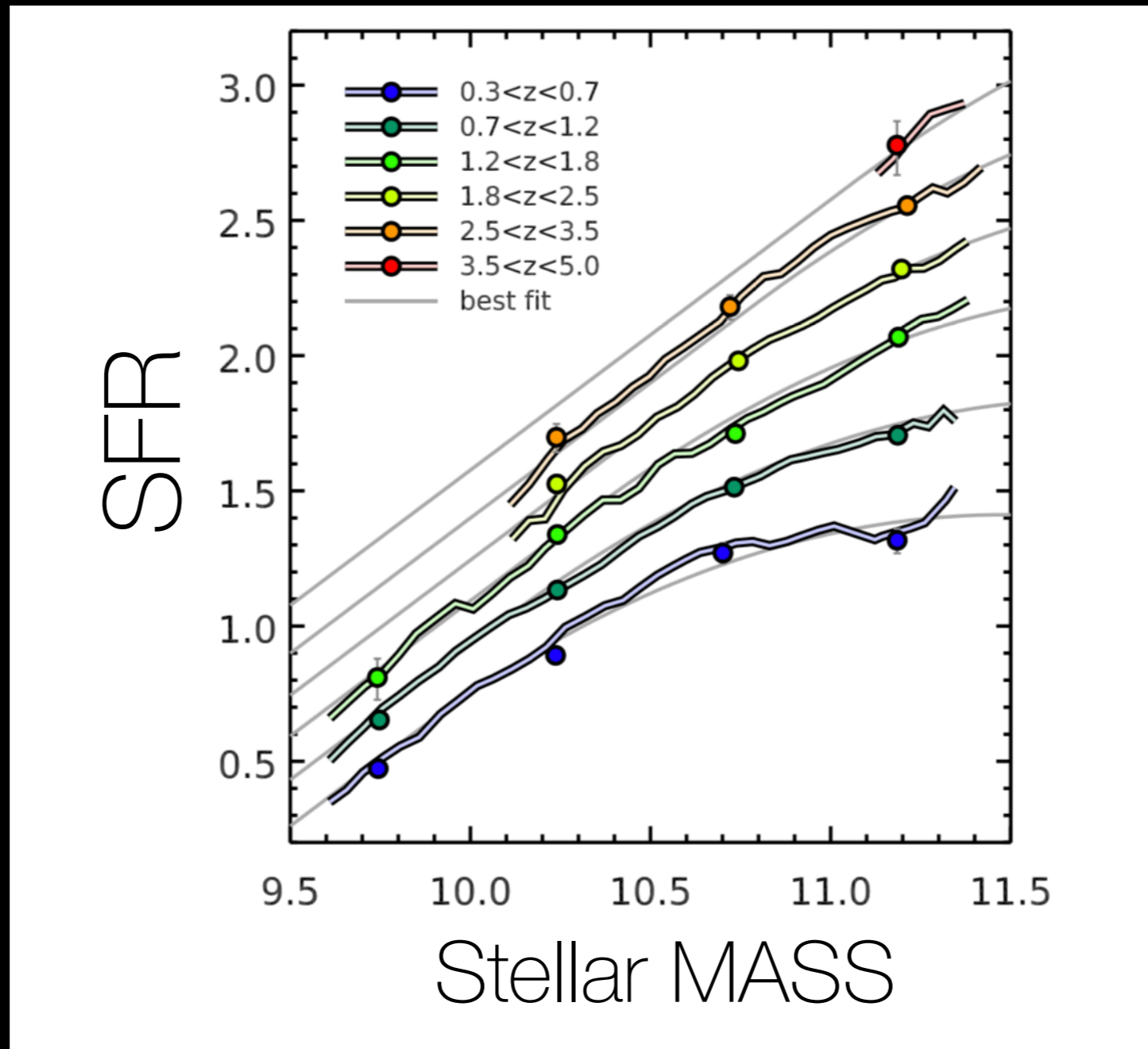
Rodighiero et al. 2011



SFR increases with stellar mass

THE MAIN SEQUENCE OF GALAXIES

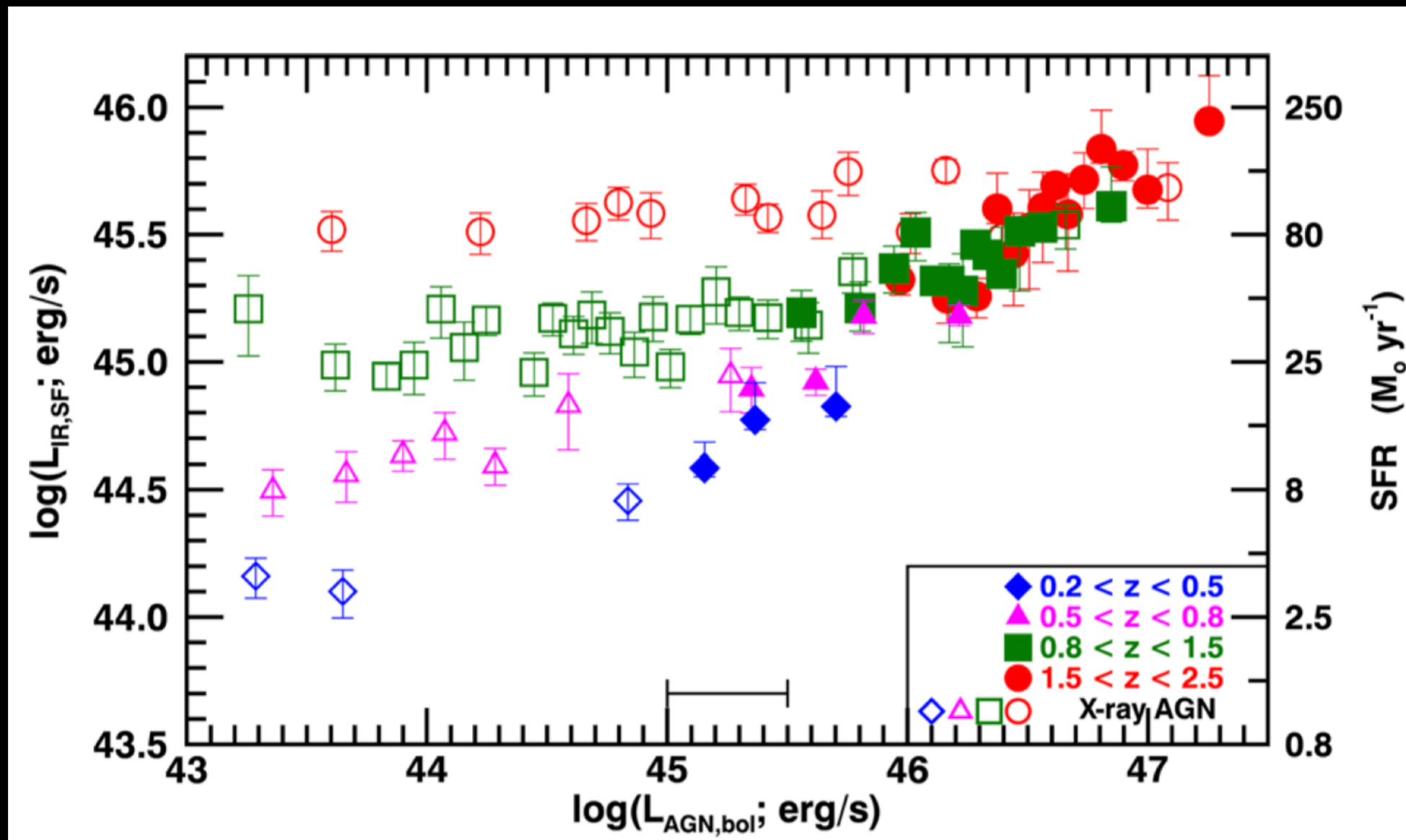
Schreiber et al. 2015



SFR increases with redshift

LACK OF RELATIONSHIP BETWEEN AGN POWER AND SFR

Stanley et al. 2018



Everything is **consistent with** normal
MS galaxy evolution!!

WHERE IS THE IMPACT OF AGNs ON GALAXIES?

Is the flat **relationship** between **SFR** and **Lx** **inconsistent** with **SMBH—galaxy** scaling **relationship/co-evolution**?

Are we **looking** at the **wrong parameters**?

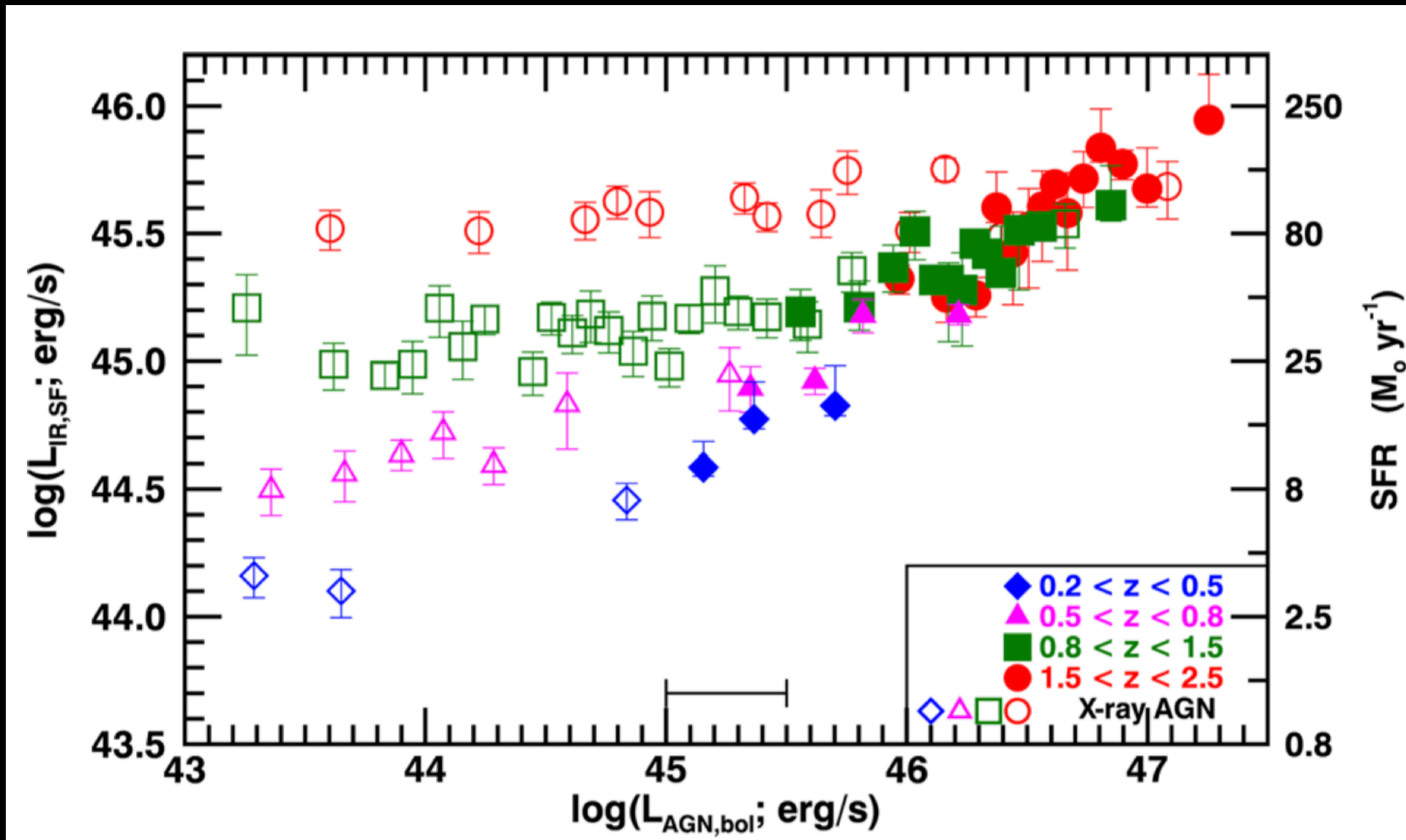
Is it due to **differences** in **timescales** or **variability**?

Aim

A deeper investigation into this flat relationship

THE DISTRIBUTION OF AGN HOST SFR

Stanley et al. 2018

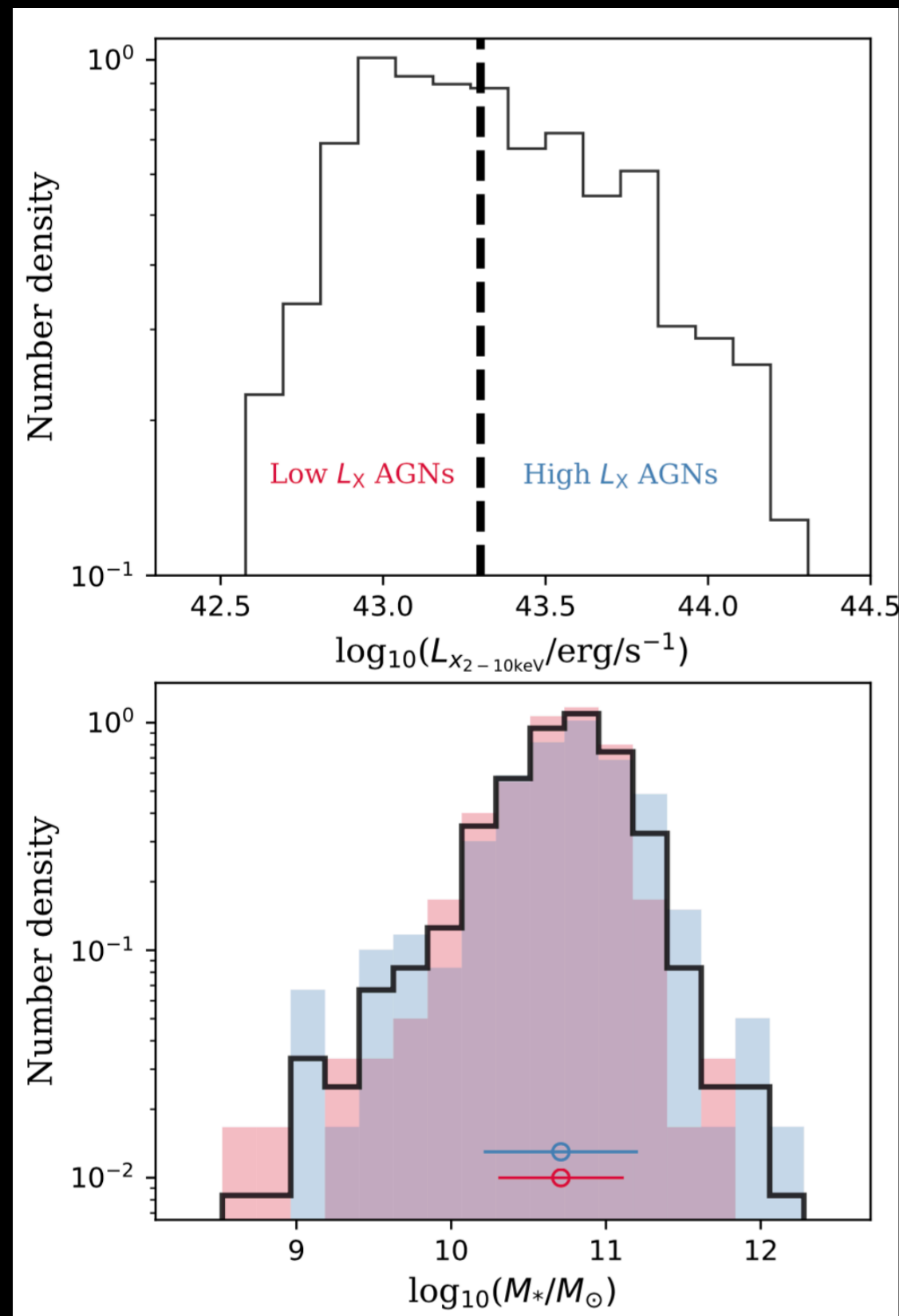


Here SFR is $\langle \text{SFR} \rangle$ and averages can be misleading.

INFERRING THE SF PROPERTIES OF AGN

HOST GALAXIES

Bernhard et al. 2019



Sample of **X-ray selected AGNs** from COSMOS, separated between **low and high L_x**

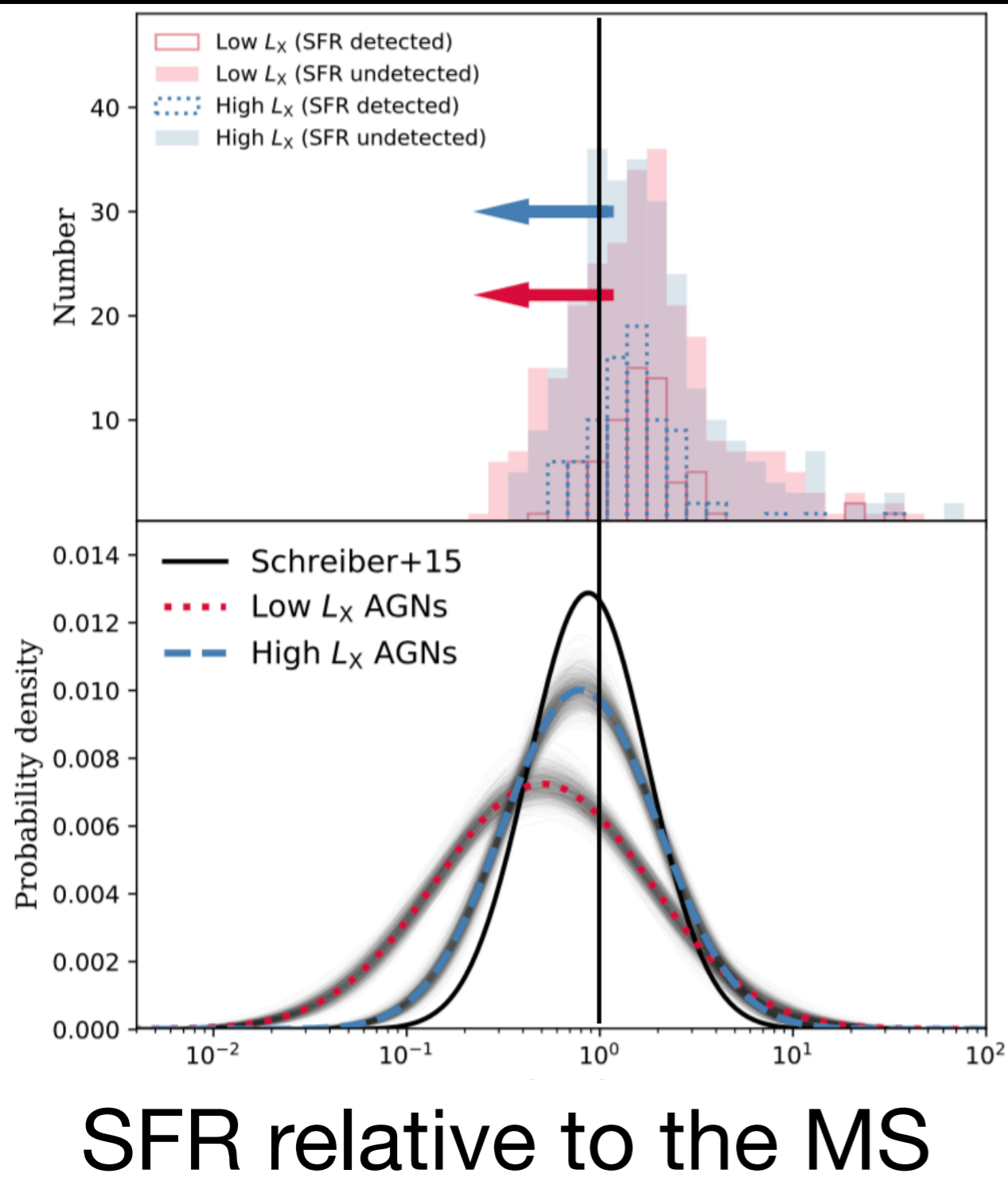
Limited to **$z \sim 1$** AGNs

Stellar masses are measured using **SED fitting** (CIGALE; Ciesla+15)

SFRs (or upper limits) are measured using **SED fitting** on **Spitzer** and **Herschel** photometries (DECOMPIR; Mullaney+11)

INFERRING THE SF PROPERTIES OF AGN HOST GALAXIES

Bernhard et al. 2019

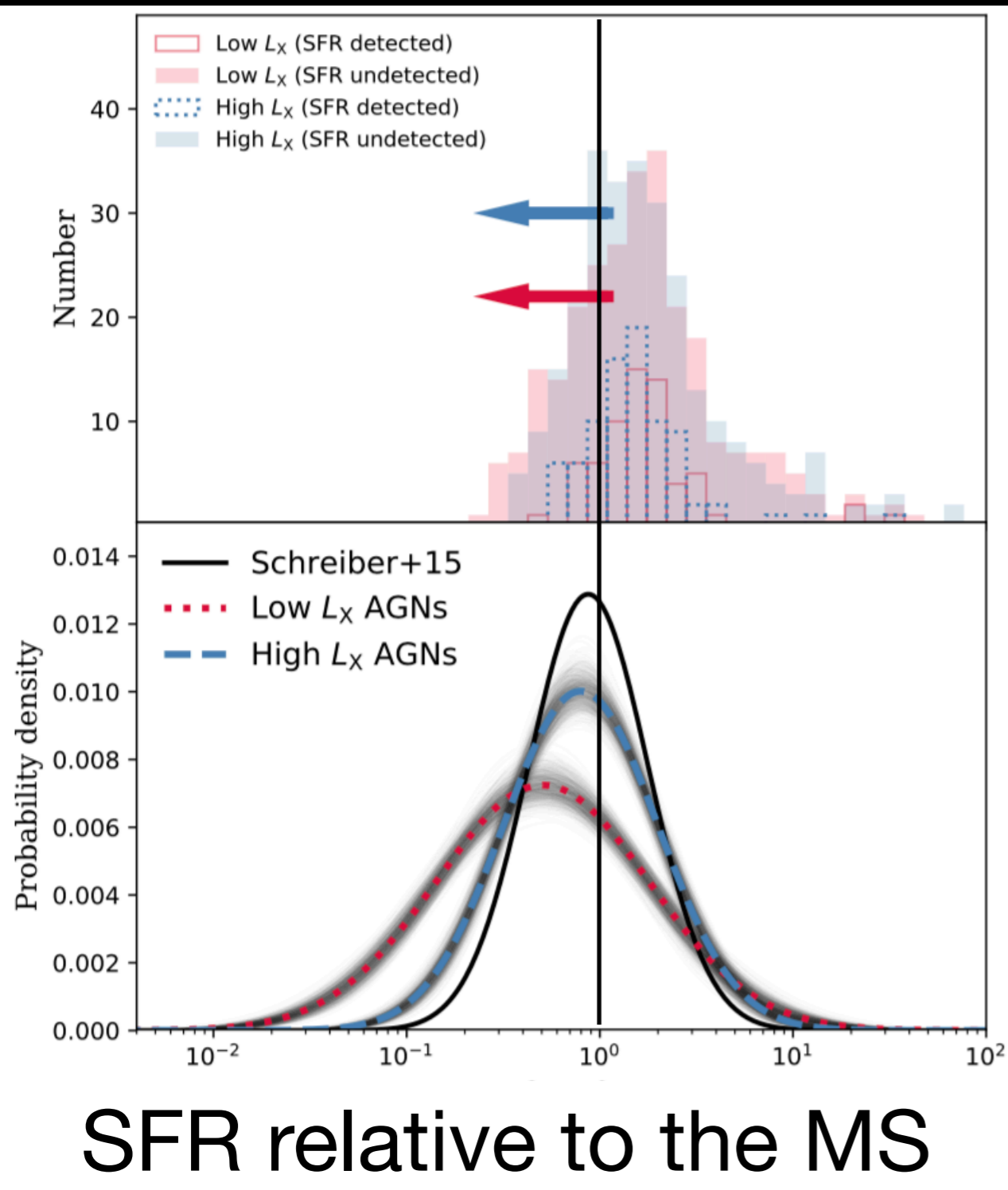


More powerful AGNs are located in more MS star-forming host galaxies when compared to their lower L_x counterparts

Lower L_x AGNs form a more diverse population (i.e. from low-to-high SFRs) when compared to their higher L_x counterparts

INFERRING THE SF PROPERTIES OF AGN HOST GALAXIES

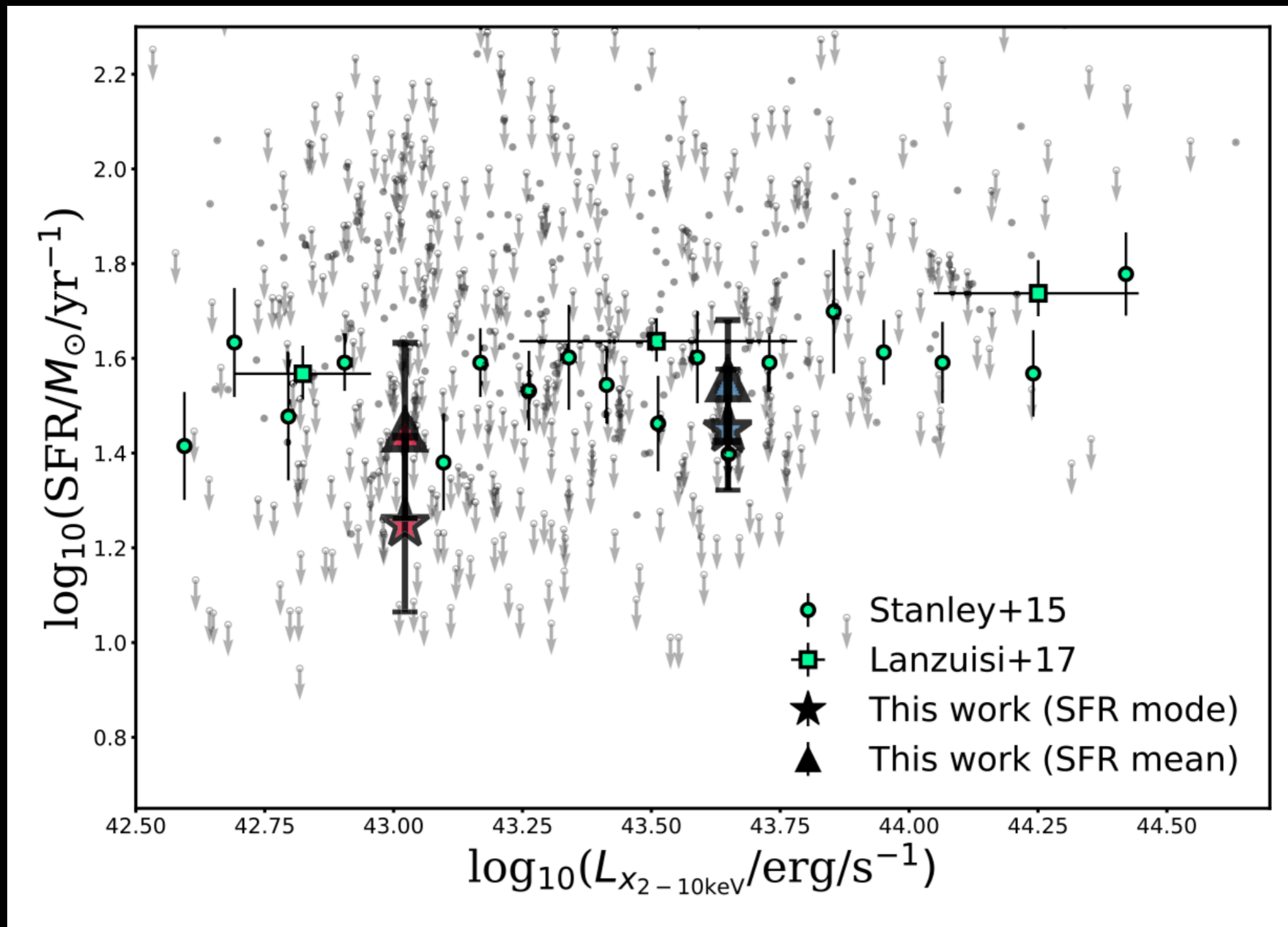
Bernhard et al. 2019



More **powerful AGN hosts** are less diverse, **more MS star-forming** galaxies when compared to their lower L_x counterparts

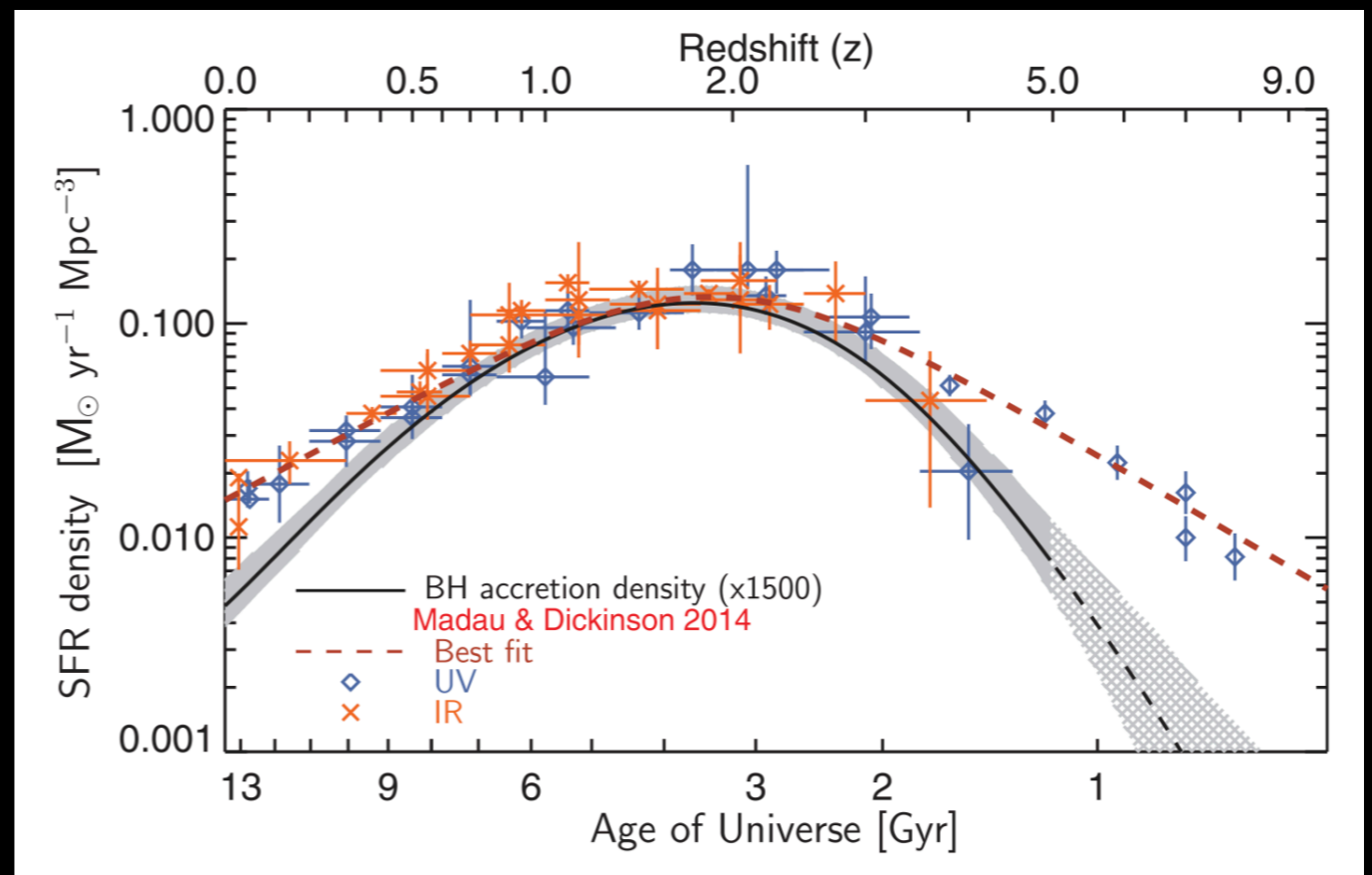
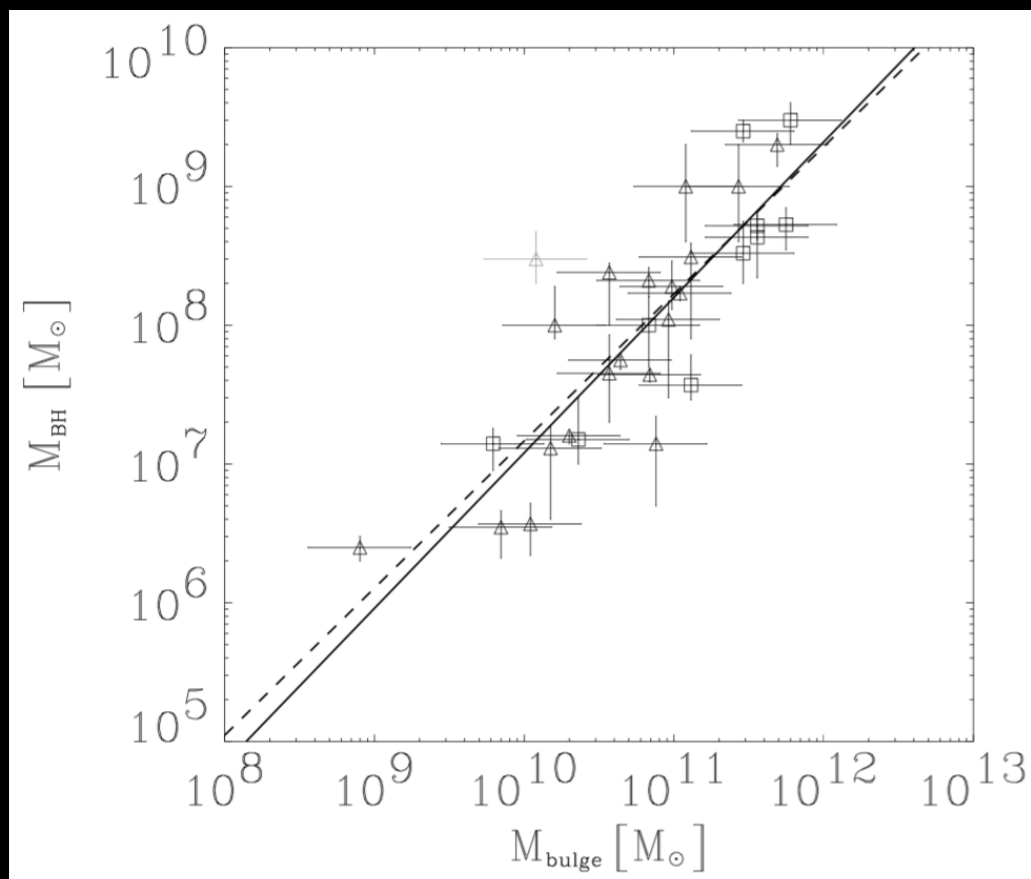
Lower L_x AGNs form a more **diverse population** (i.e. from low-to-high SFRs) when compared to their higher L_x counterparts

FLAT RELATIONSHIP BETWEEN <SFR> AND LX



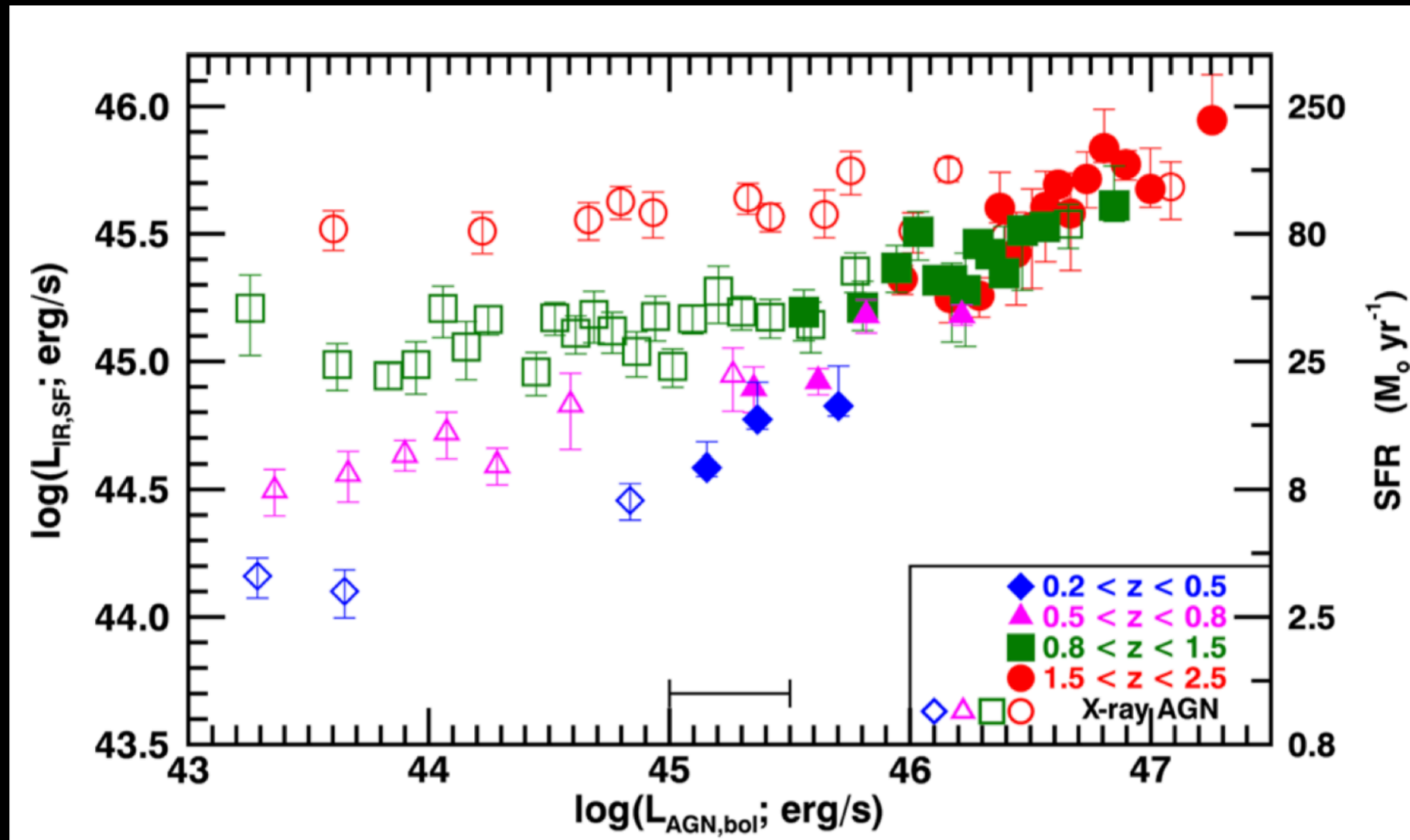
TAKE HOME MESSAGES

TAKE HOME MESSAGES



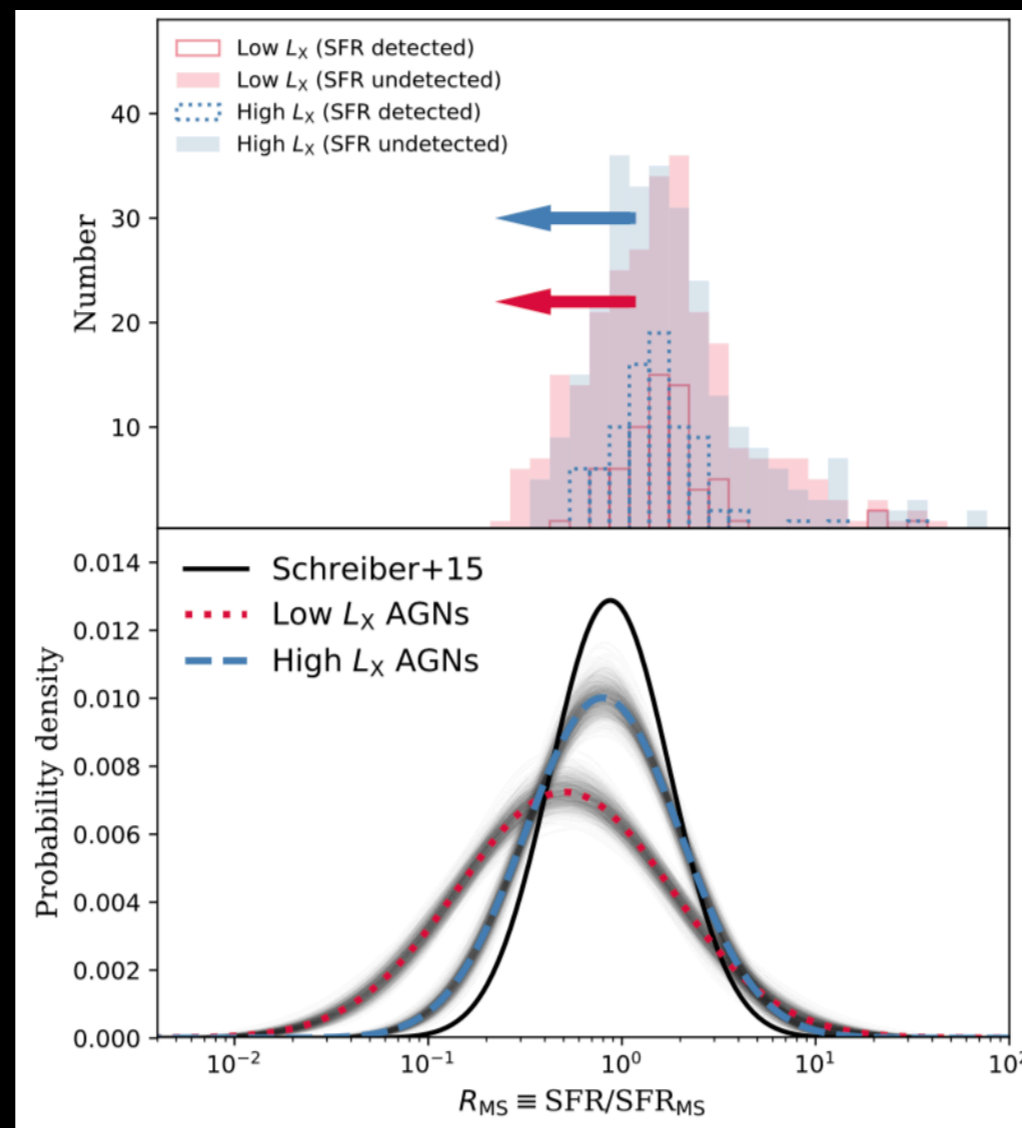
Somehow, the way **galaxies** grow via **SF** is **connected** to the way **SMBHs** grow via **accretion**

TAKE HOME MESSAGES



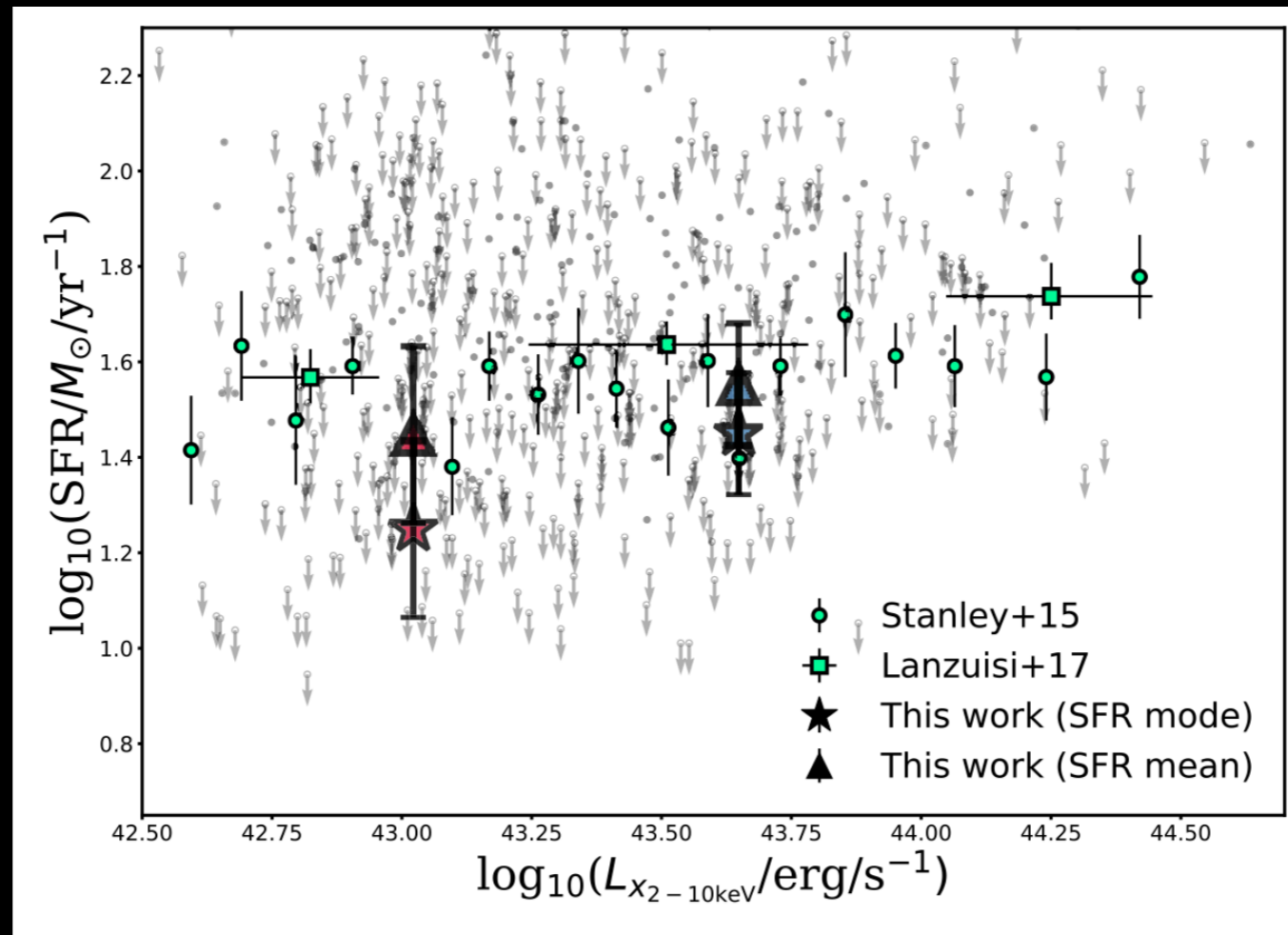
Relationship between SFR and L_x fully
consistent with MS galaxy evolution

TAKE HOME MESSAGES



More **powerful AGNs** are more consistent with MS **star-forming** galaxies

TAKE HOME MESSAGES



Yet, these **differences** in the **distributions** are fully consistent with a **flat** linear mean **SFR** vs **L_x**

THANK YOU

More **powerful AGN hosts** are **less diverse**, more **MS star-forming** galaxies when compared to their lower Lx counterparts

Lower Lx AGNs form a more **diverse population** (i.e. from low-to-high SFRs) when compared to their higher Lx counterparts

The **distributions** are fully **consistent** with the **flat SFR-Lx relationship**