Jet Feedback on the Hosts of Radio Galaxies

Lauranne Lanz

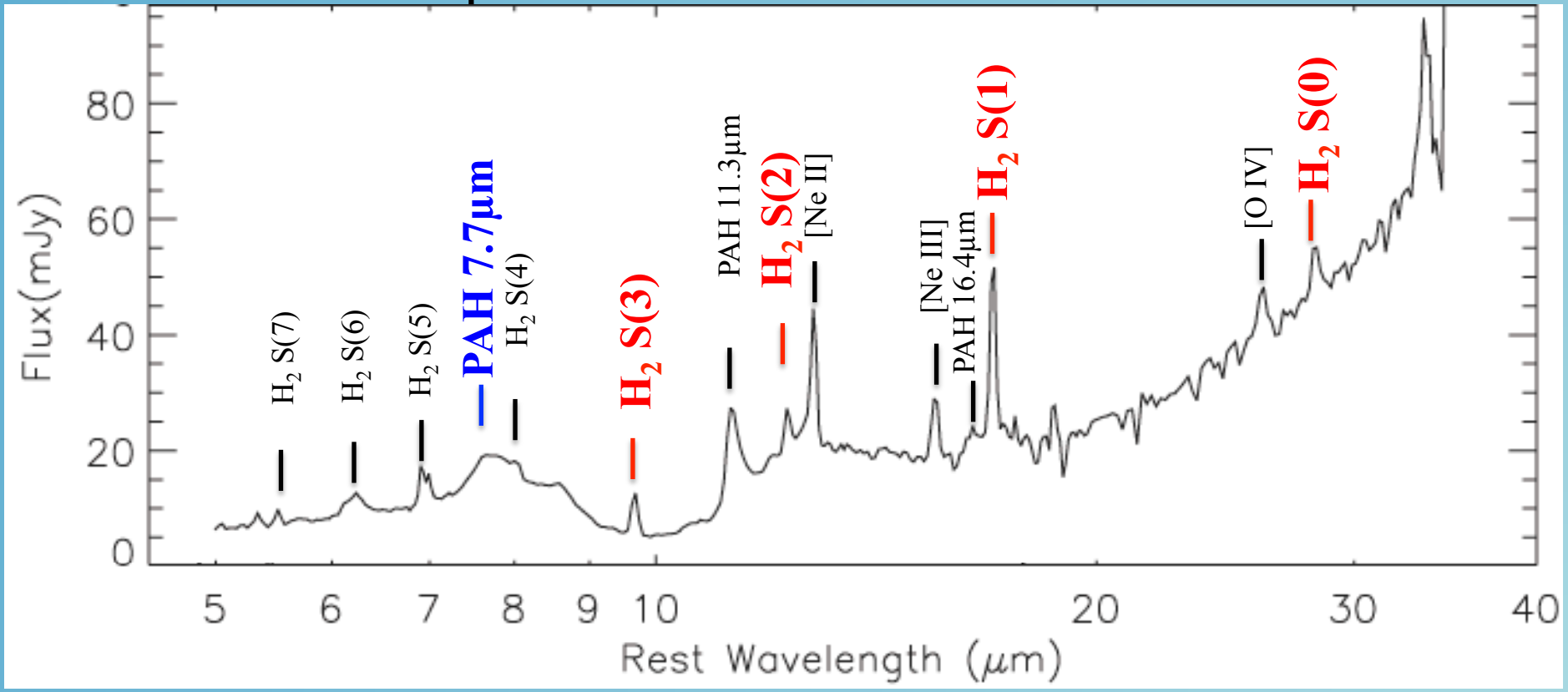
In collaboration with Patrick Ogle, Phil Appleton, and Katherine Alatalo

Bangalore, India

October 17, 2015

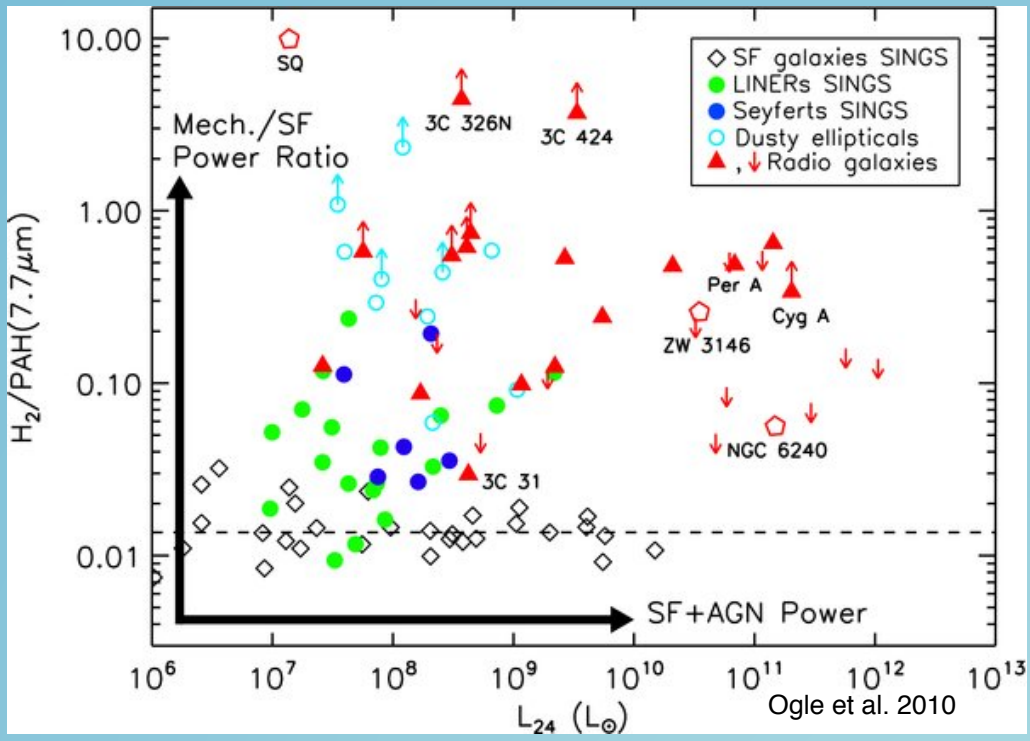
Warm H_2 Luminous Galaxies

- Detected with Spitzer IRS



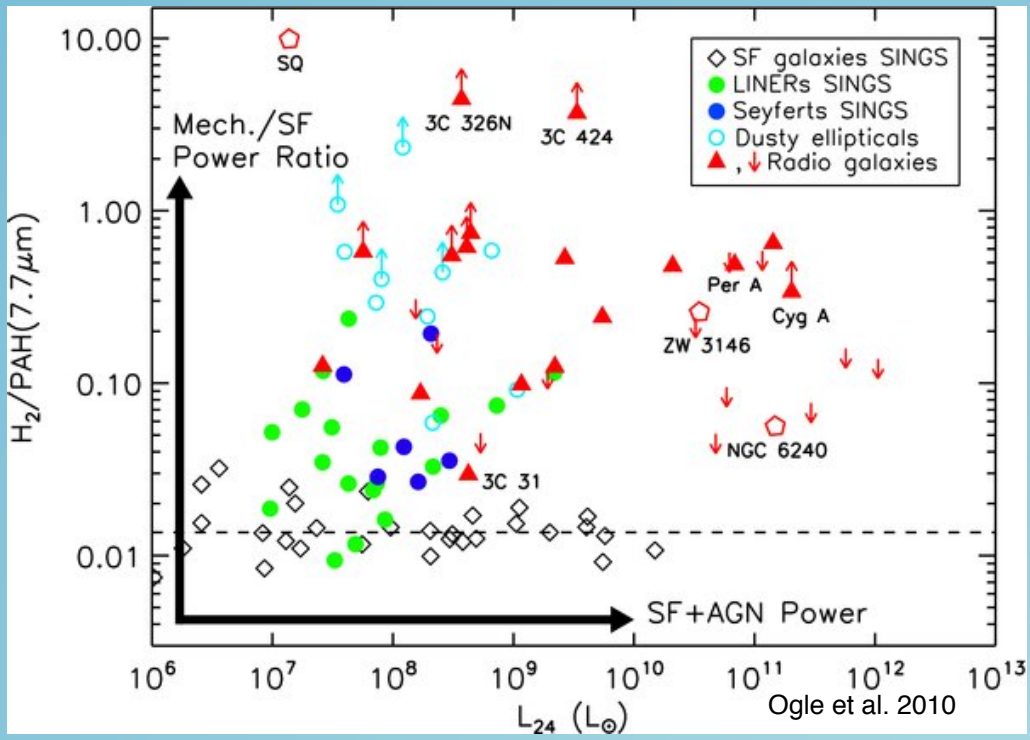
Warm H_2 Luminous Galaxies

- Detected with Spitzer IRS
- $L(H_2)/L(PAH\ 7.7\mu m) > 0.04$



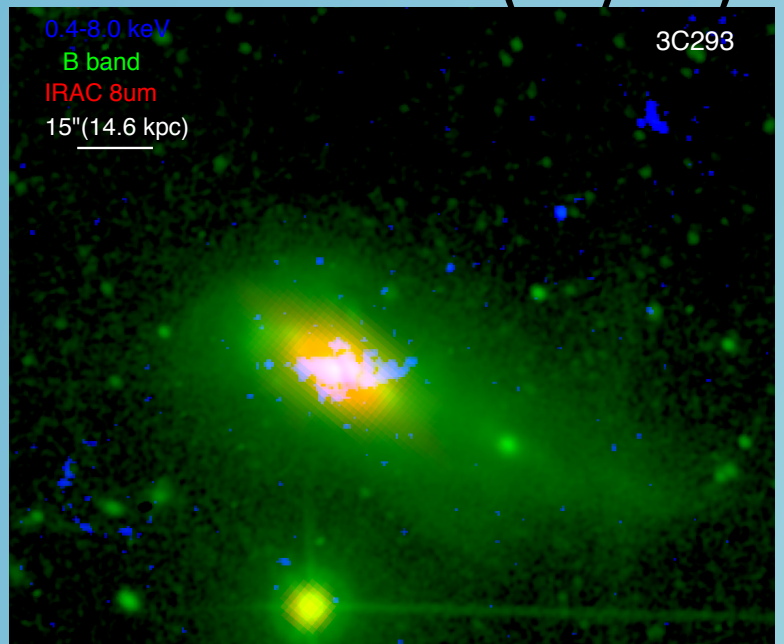
Warm H_2 Luminous Galaxies

- Detected with Spitzer IRS
- $L(H_2)/L(PAH\ 7.7\mu m) > 0.04$
- H_2 powered by shocks:
  - Driven by radio jets
  - Due to galaxy interactions
- In radio galaxies:
  - $L(H_2)=7x10^{38}$-$2x10^{42}$ erg/s
  - $M(H_2)$=up to $4x10^{10}\ M_\odot$
  - $T(H_2)$=100-1500 K

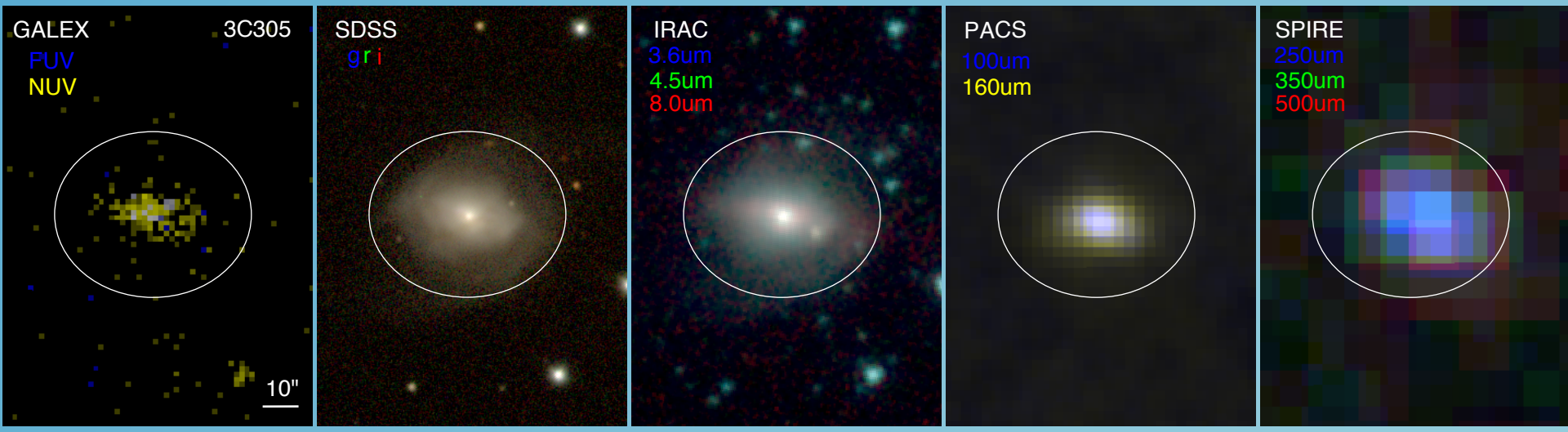


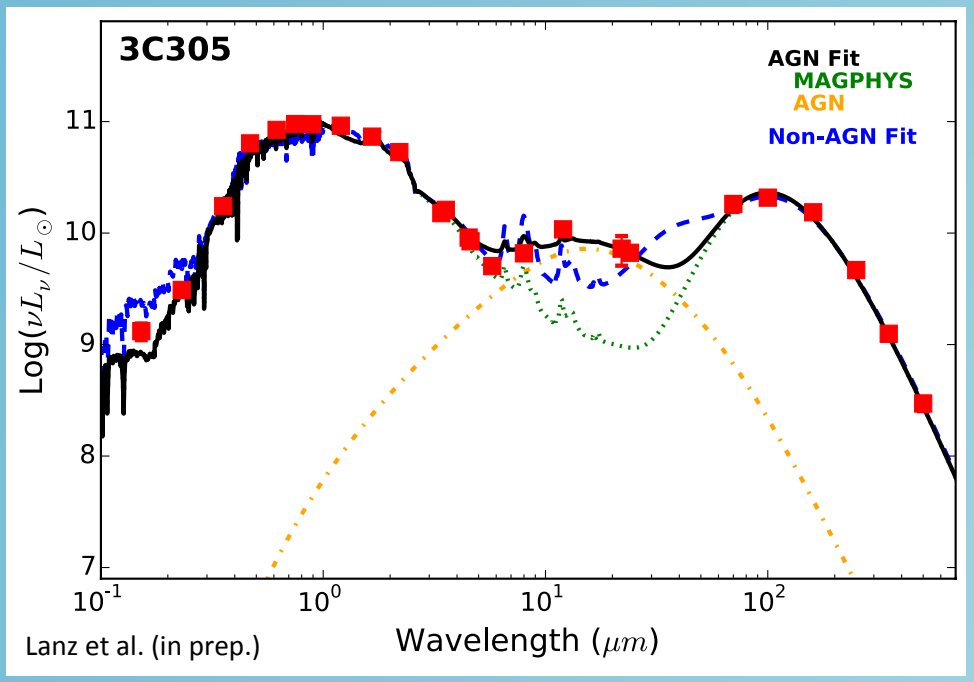
Sample and Observations

- 22 warm H_2 radio galaxies from Ogle+2010, Guillard+2012
- UV: GALEX (20.5/22)
- Optical: SDSS (16/22)
- NIR: 2MASS (22/22)
- MIR: IRAC (16/22), MIPS (18/22), and WISE (22/22)
- FIR: Herschel PACS and SPIRE (19/22)

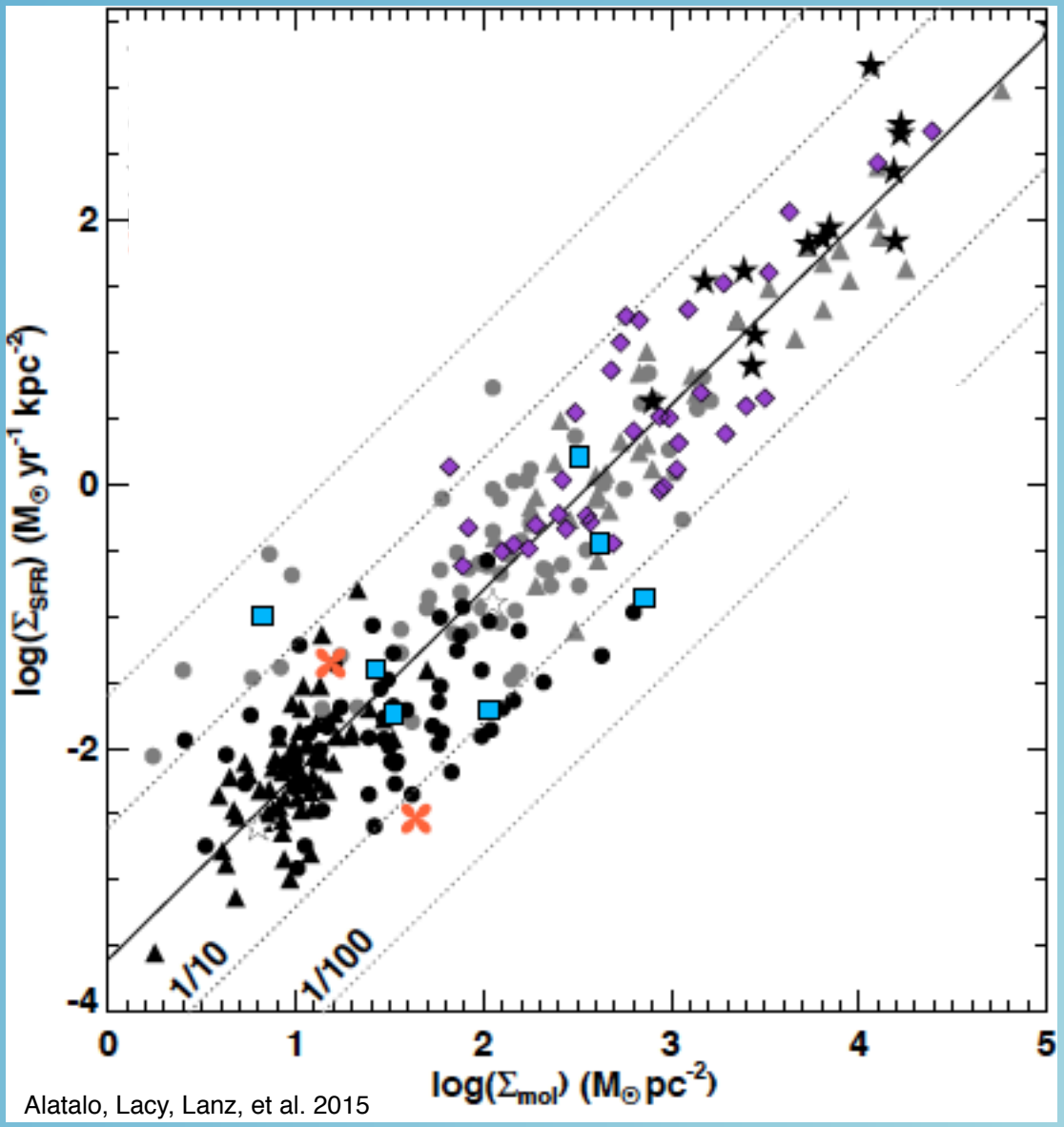


Measuring Galaxy Properties



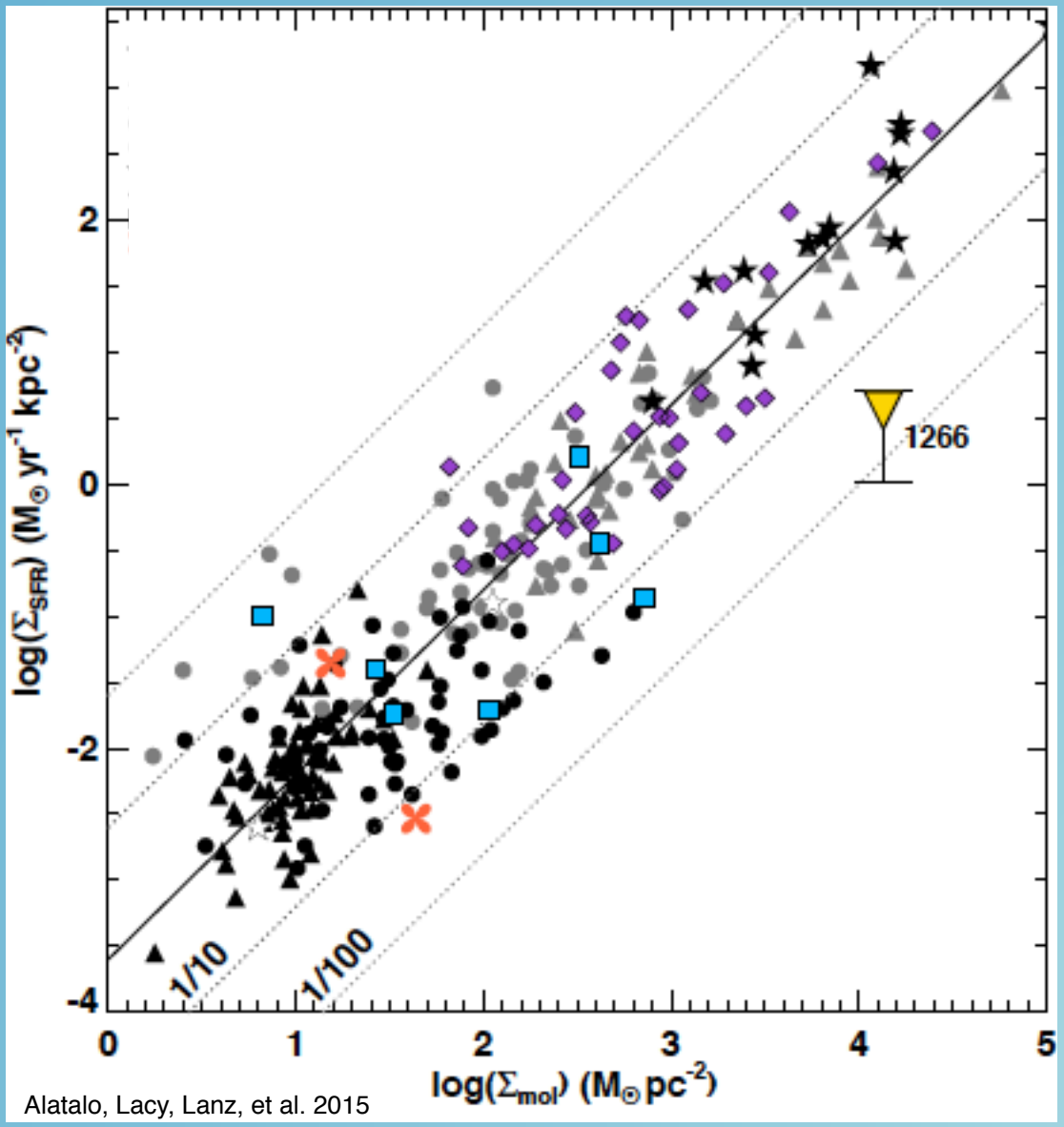


Star Formation Suppression: Kennicutt-Schmidt Diagram



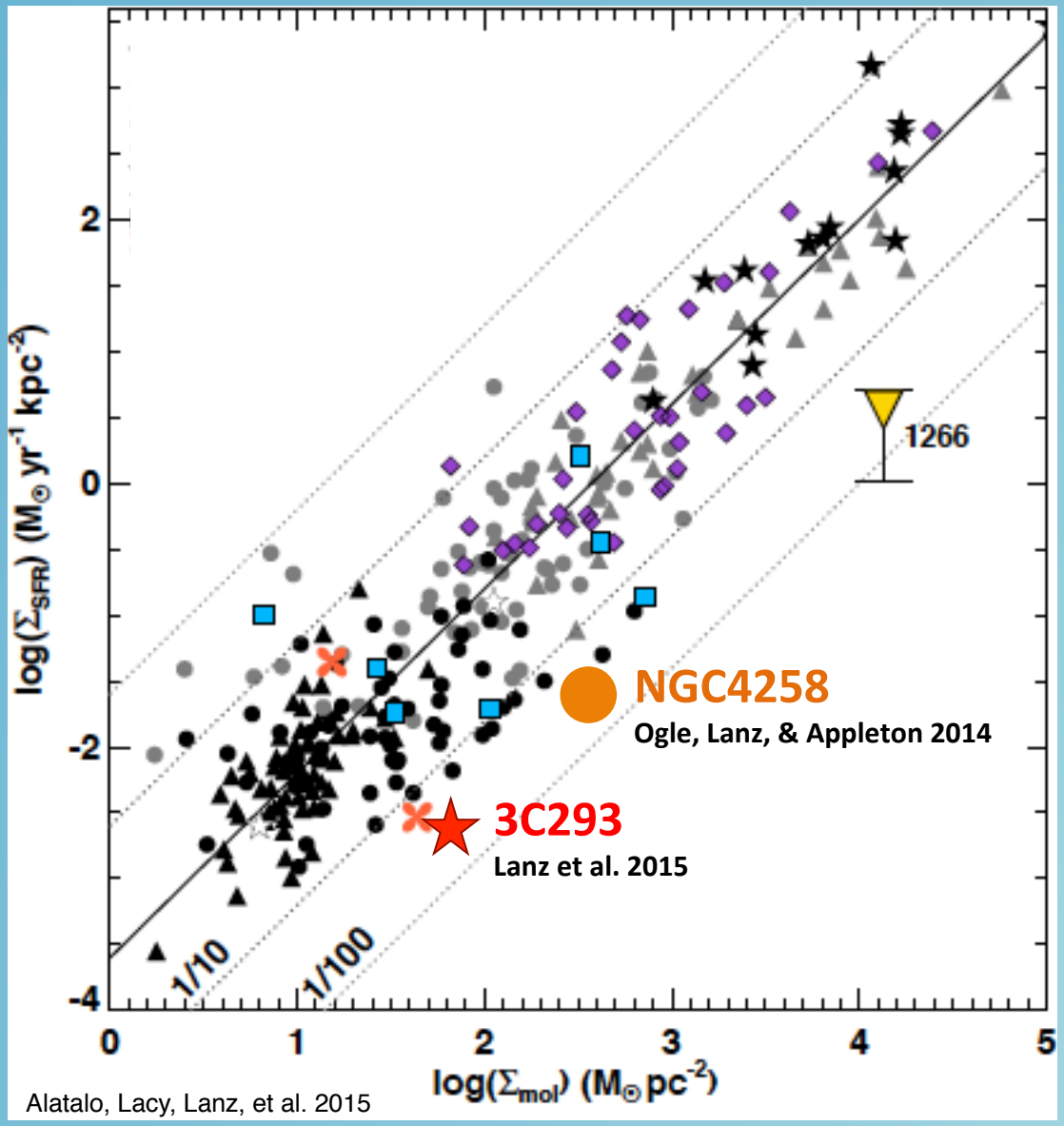
Alatalo, Lacy, Lanz, et al. 2015

Star Formation Suppression: Kennicutt-Schmidt Diagram

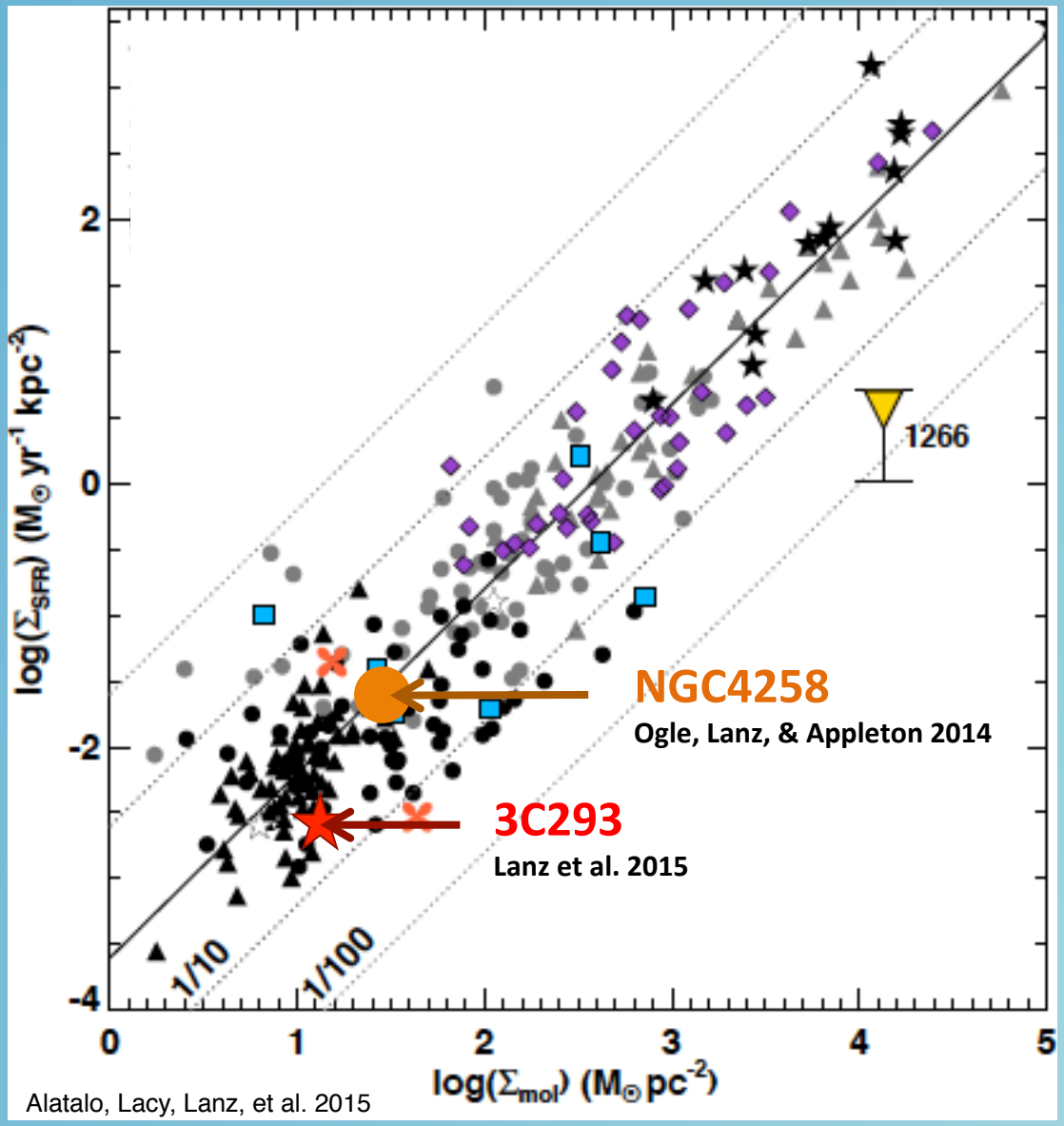


Alatalo, Lacy, Lanz, et al. 2015

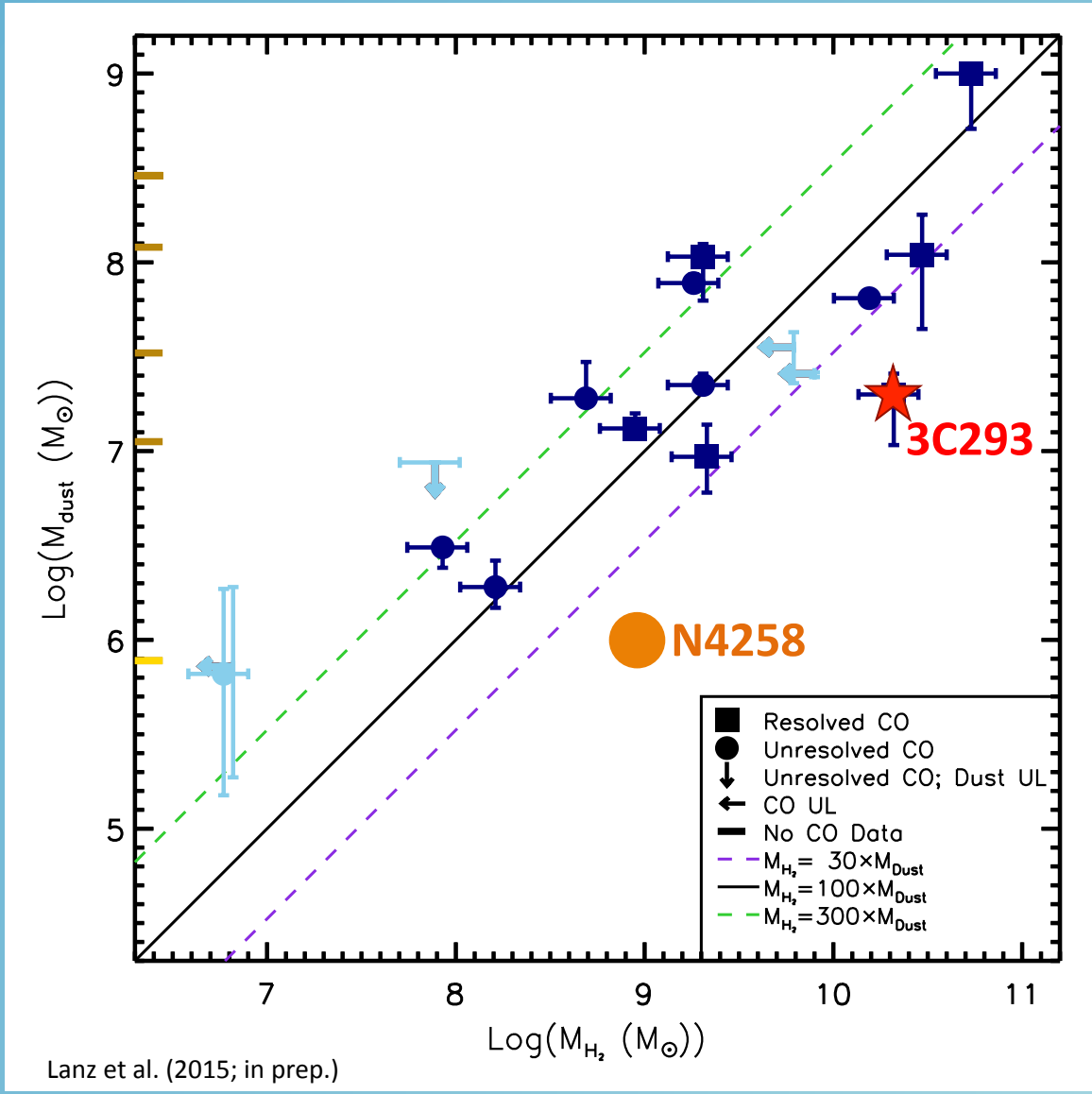
Star Formation Suppression: Kennicutt-Schmidt Diagram



Star Formation Suppression: Kennicutt-Schmidt Diagram

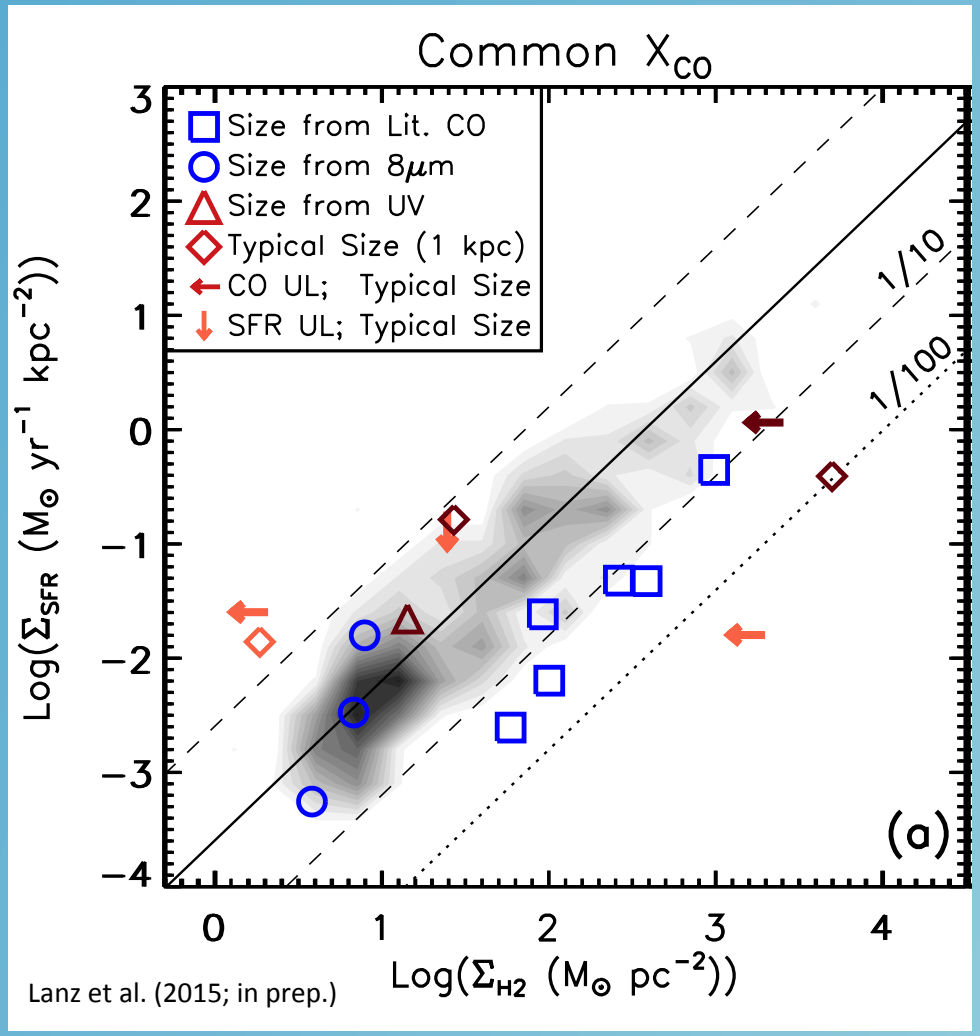


Star Formation Suppression: Gas-to-Dust Ratio

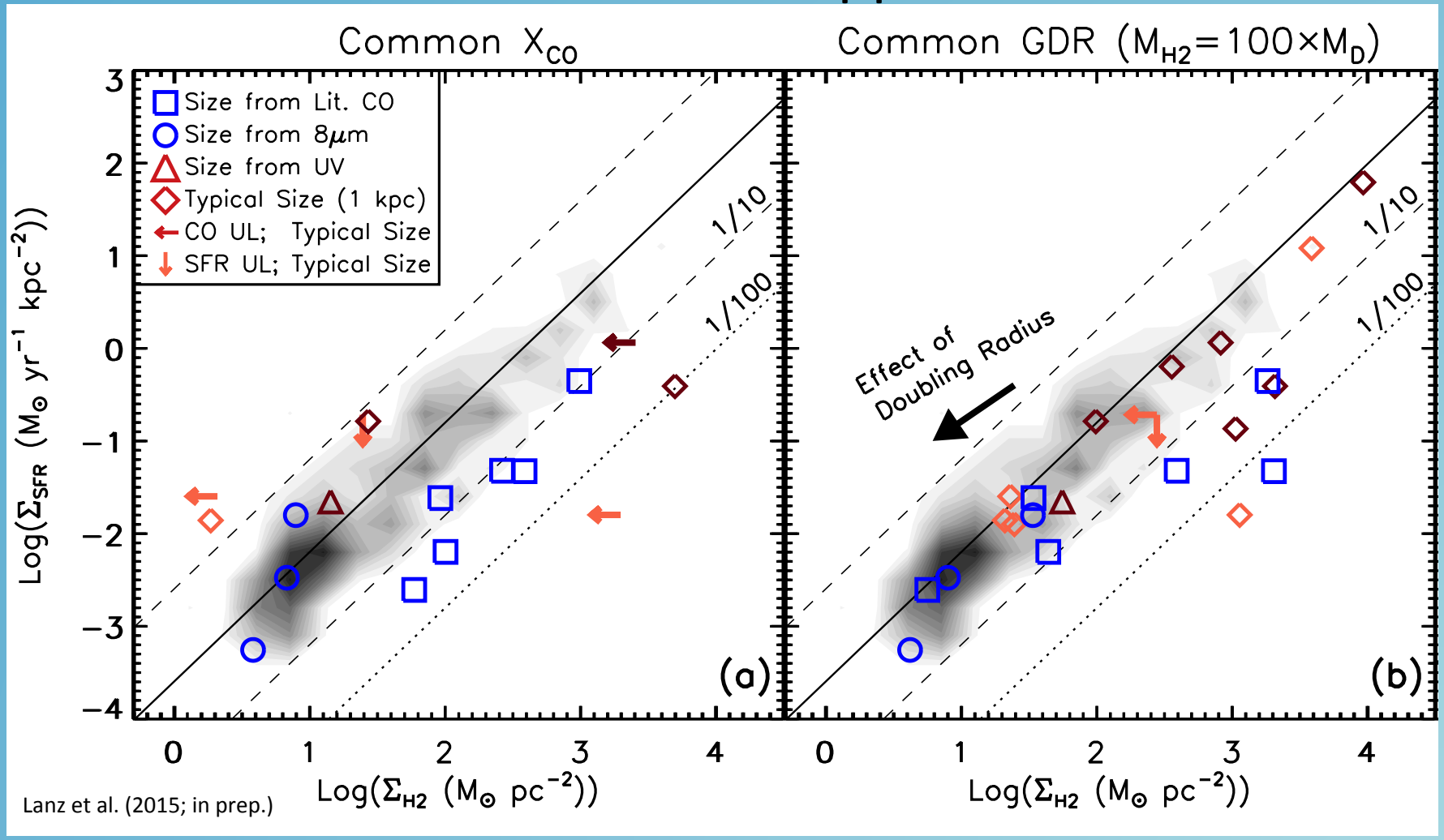


Lanz et al. (2015; in prep.)

Star Formation Suppression

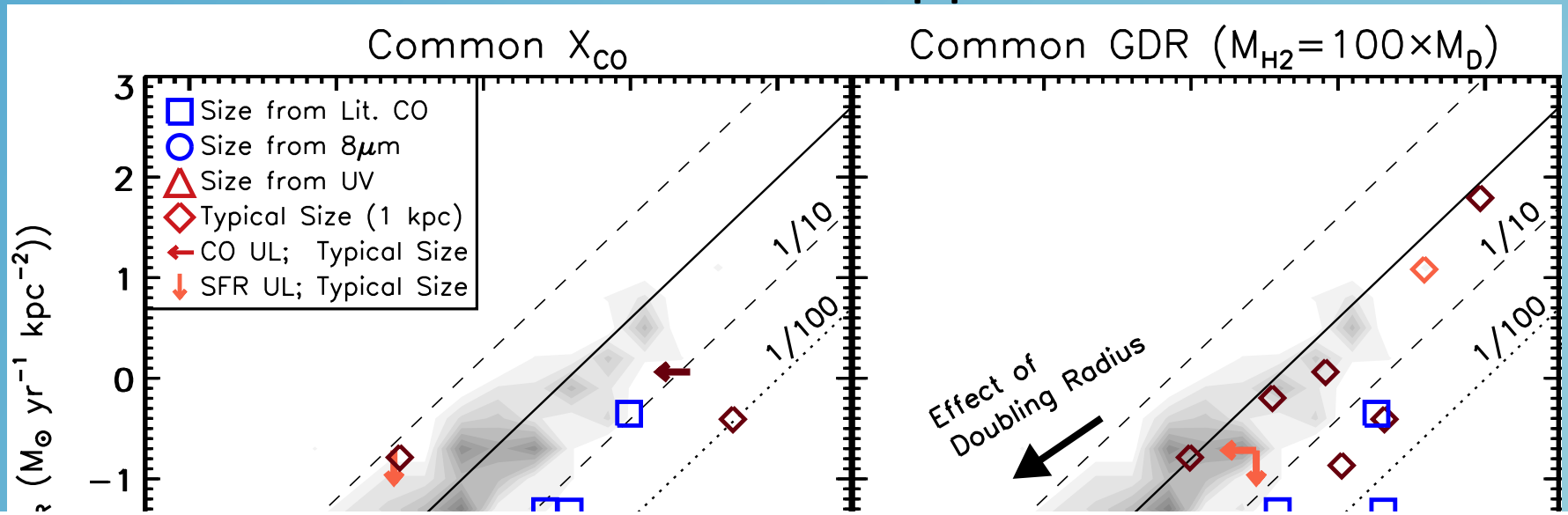


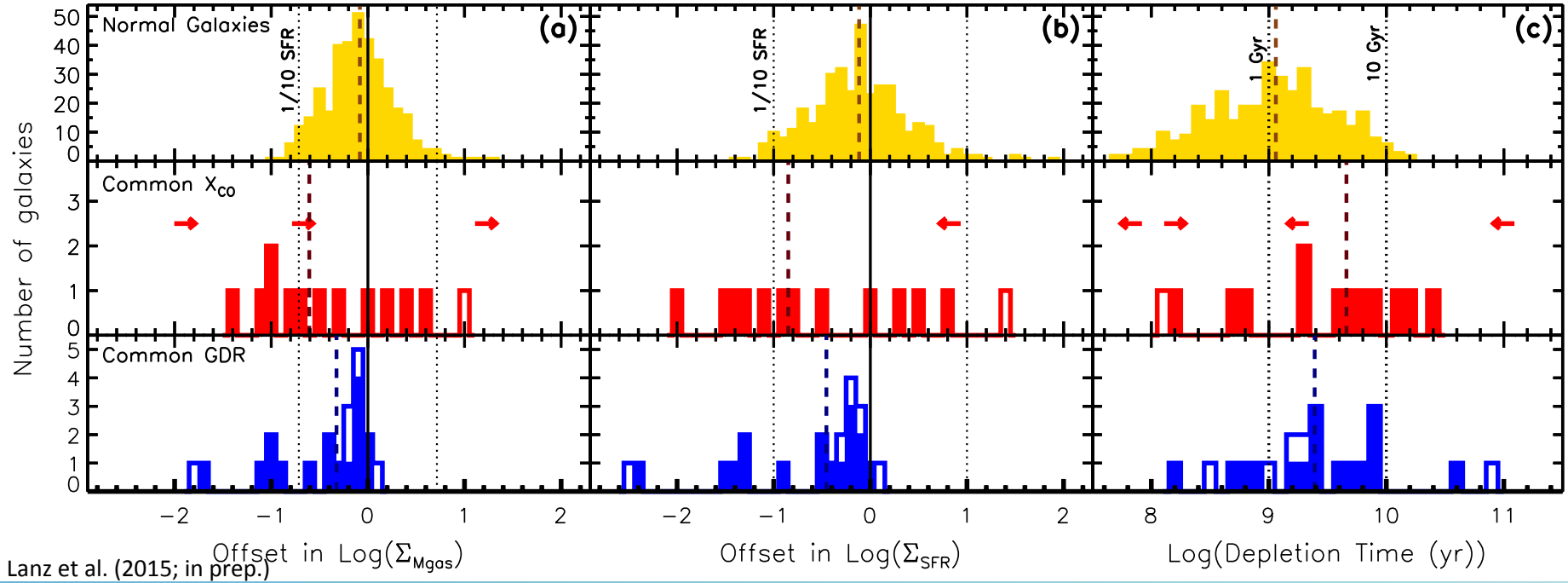
Star Formation Suppression



Lanz et al. (2015; in prep.)

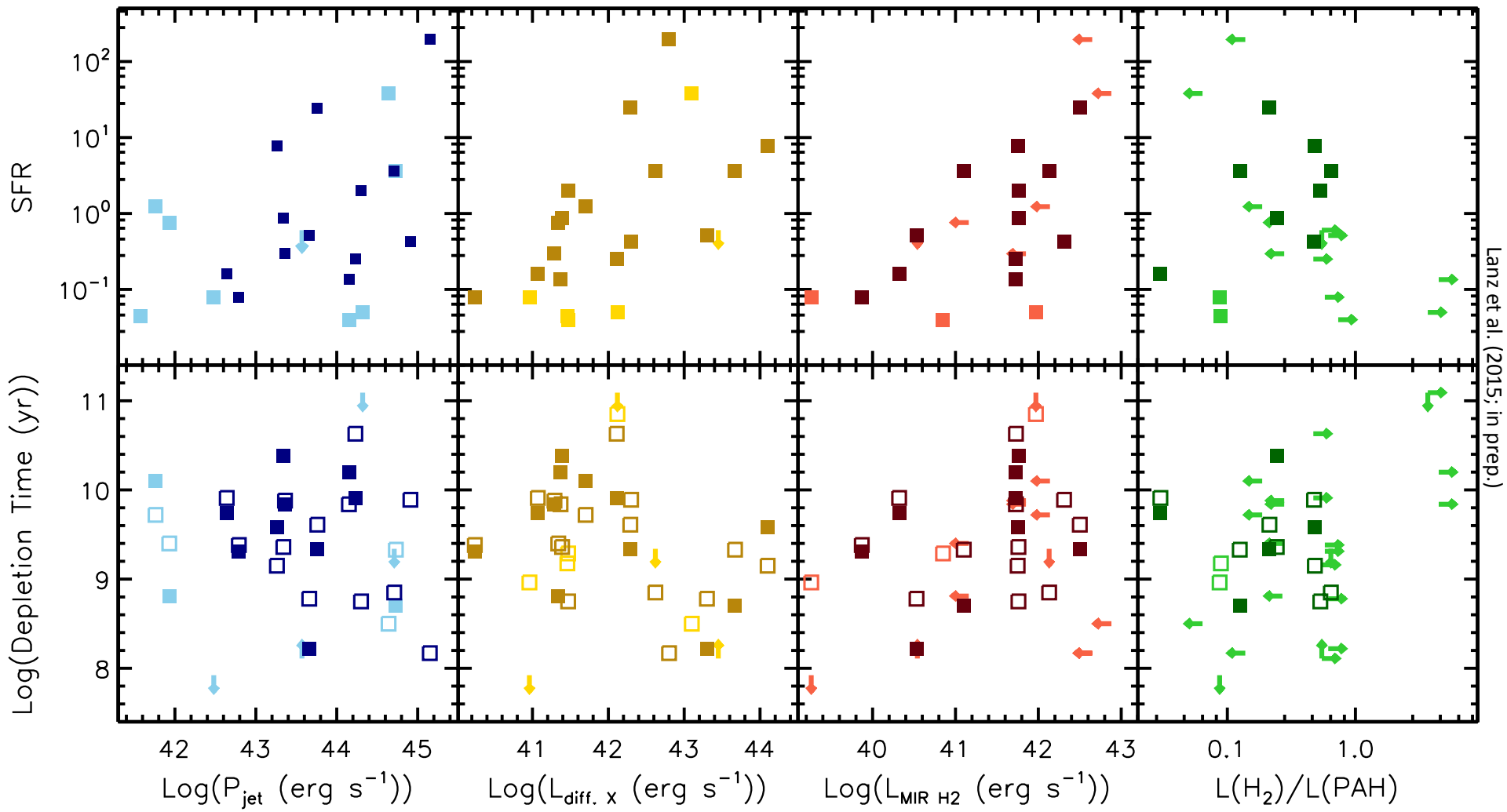
Star Formation Suppression





Lanz et al. (2015; in prep.)

Does Star Formation Suppression Correlate with Jet Feedback?



Summary

- ~30% of radio galaxies contain large amounts of 100-1500 K H_2, heated by shocks, making them excellent laboratories for examining the effects of jet feedback.

- The extreme gas-to-dust ratios seen in 3C 293 and NGC 4258 are not representative of most H2 luminous radio galaxies.

- Star formation in these galaxies is suppressed by a factor of 3-6, statistically different from normal galaxies, but not clearly correlated with jet feedback indicators.

Questions?