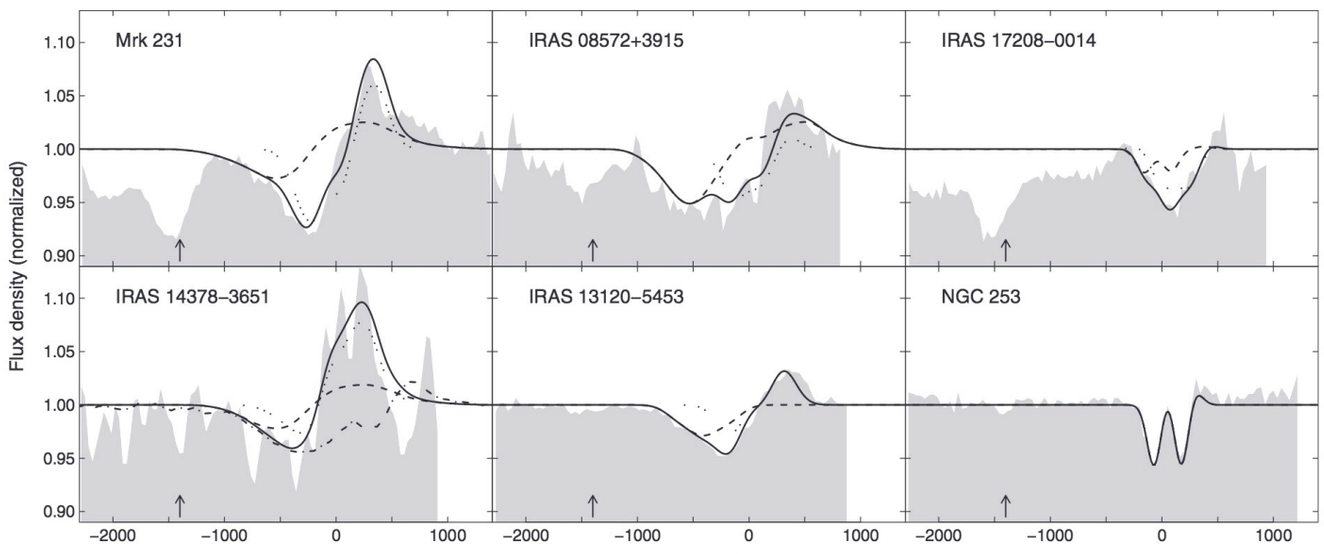
An observer's perspective on the co-evolution of galaxies & supermassive black holes

David Rosario (Durham)

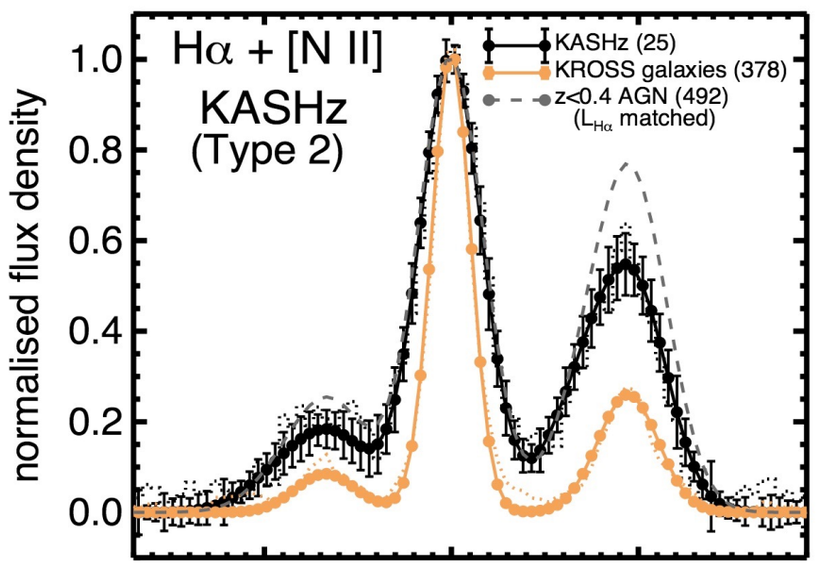
Active Galactic Nuclei:
High octane fuel for the engine of galactic change

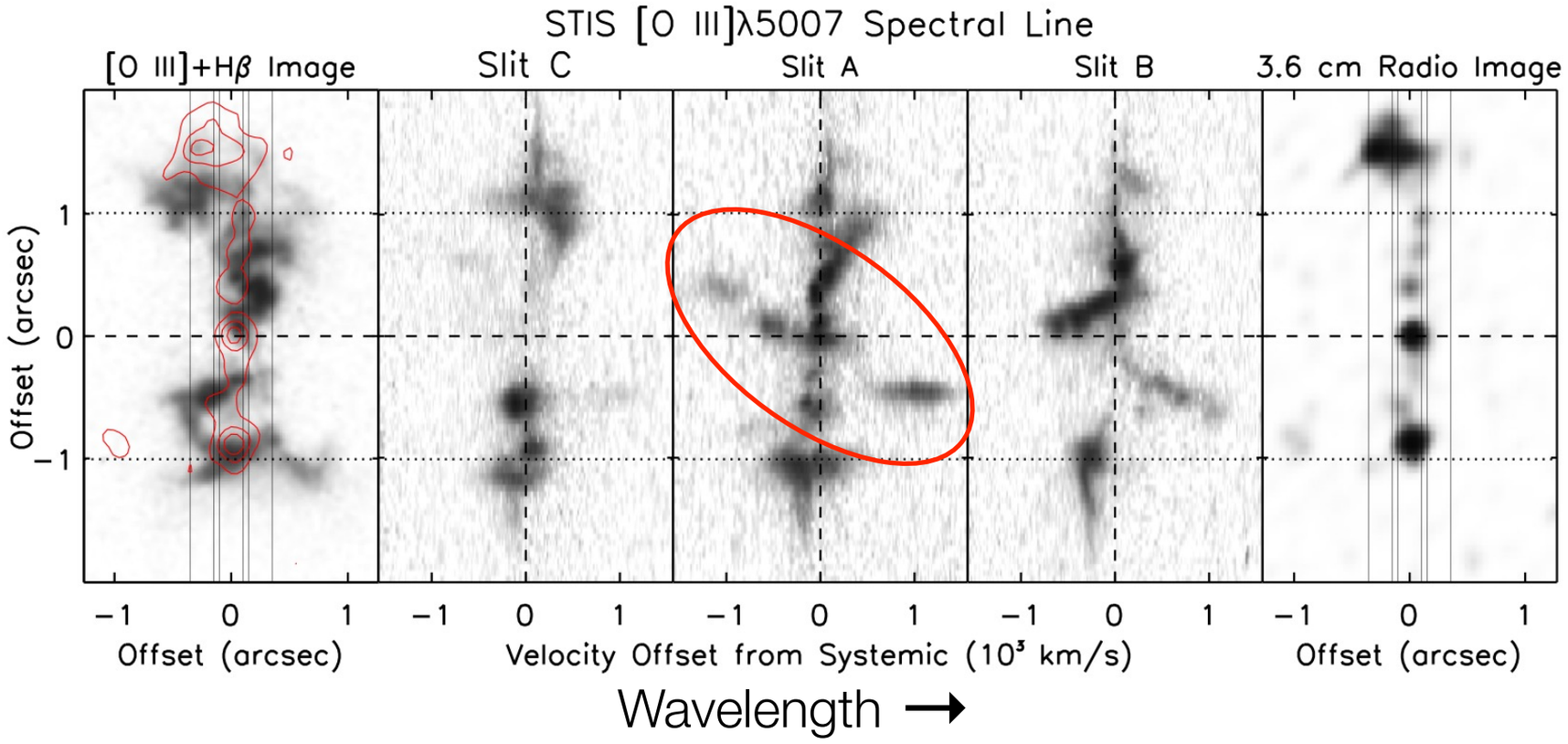
Sturm+ (2011)

OH (79 μm) line spectra



Harrison+ (2016)



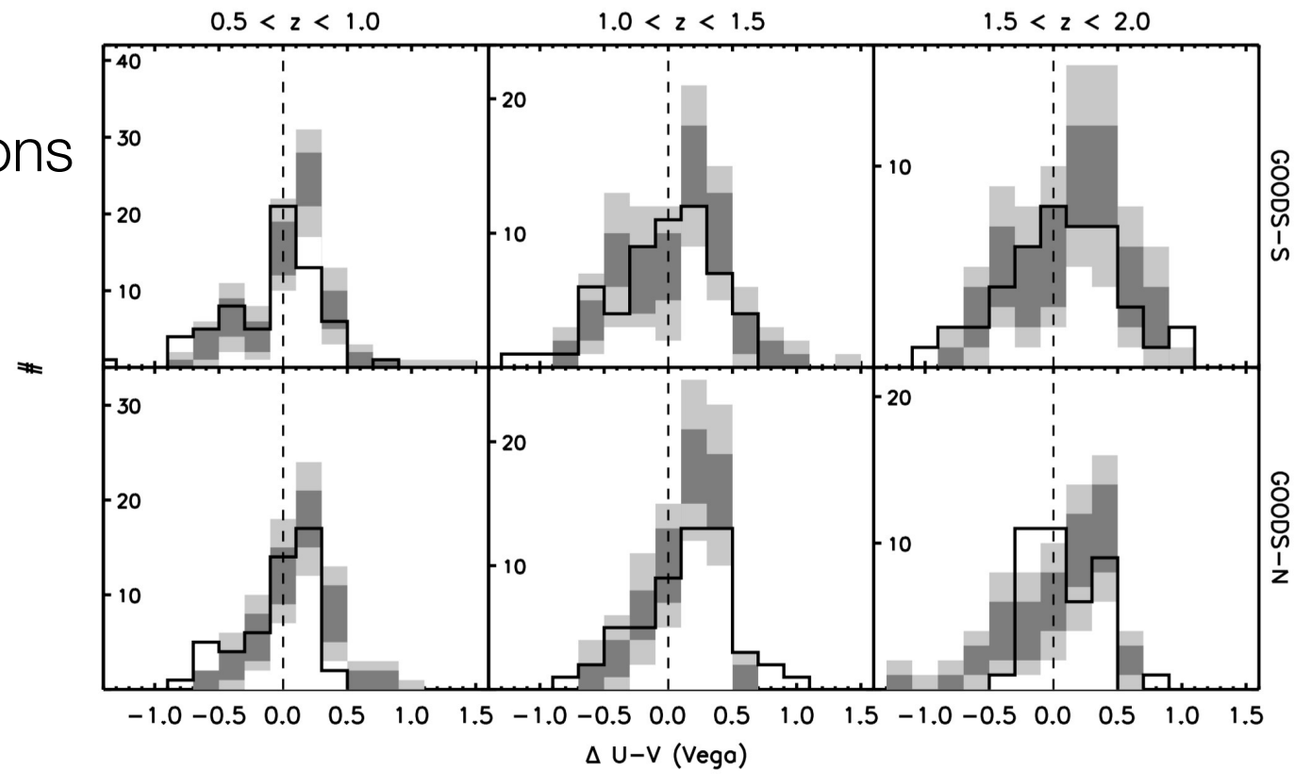


Markarian 34;
Rosario+ (in prep.)

AGN vs. Inactive galaxies

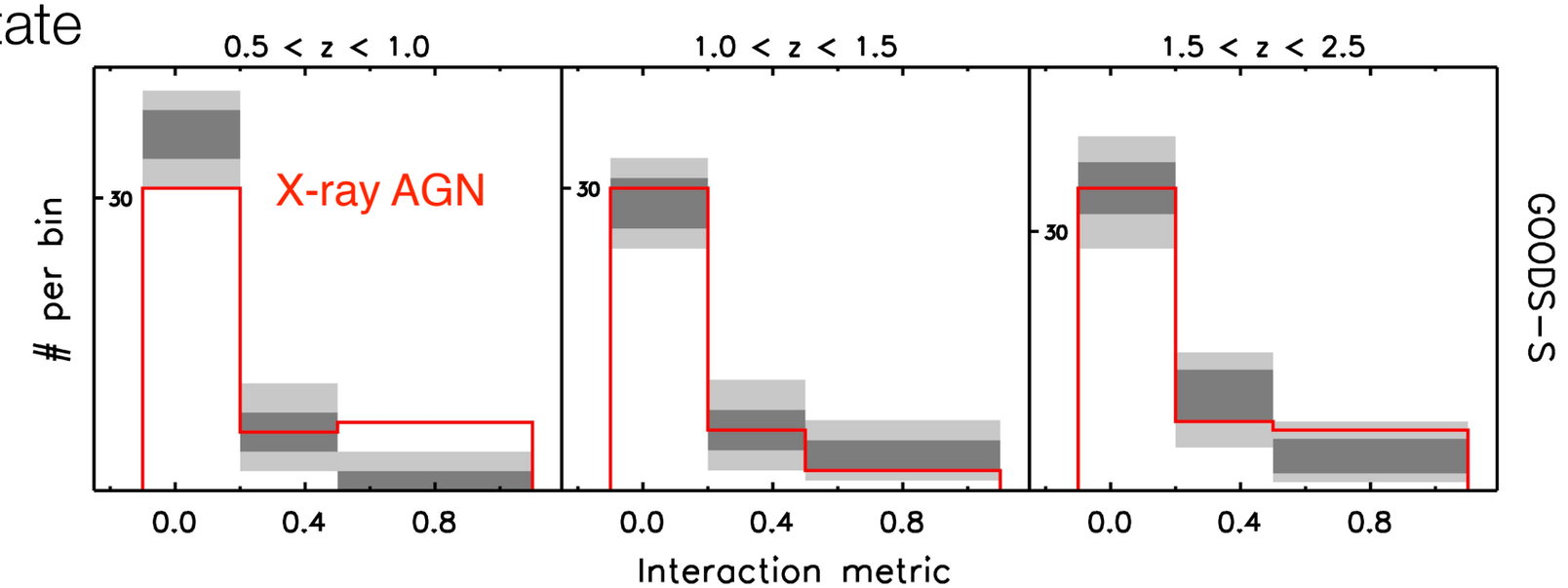
apples vs. oranges? Or just orange apples?

UV-to-optical colour distributions



Rosario+ (2013a)

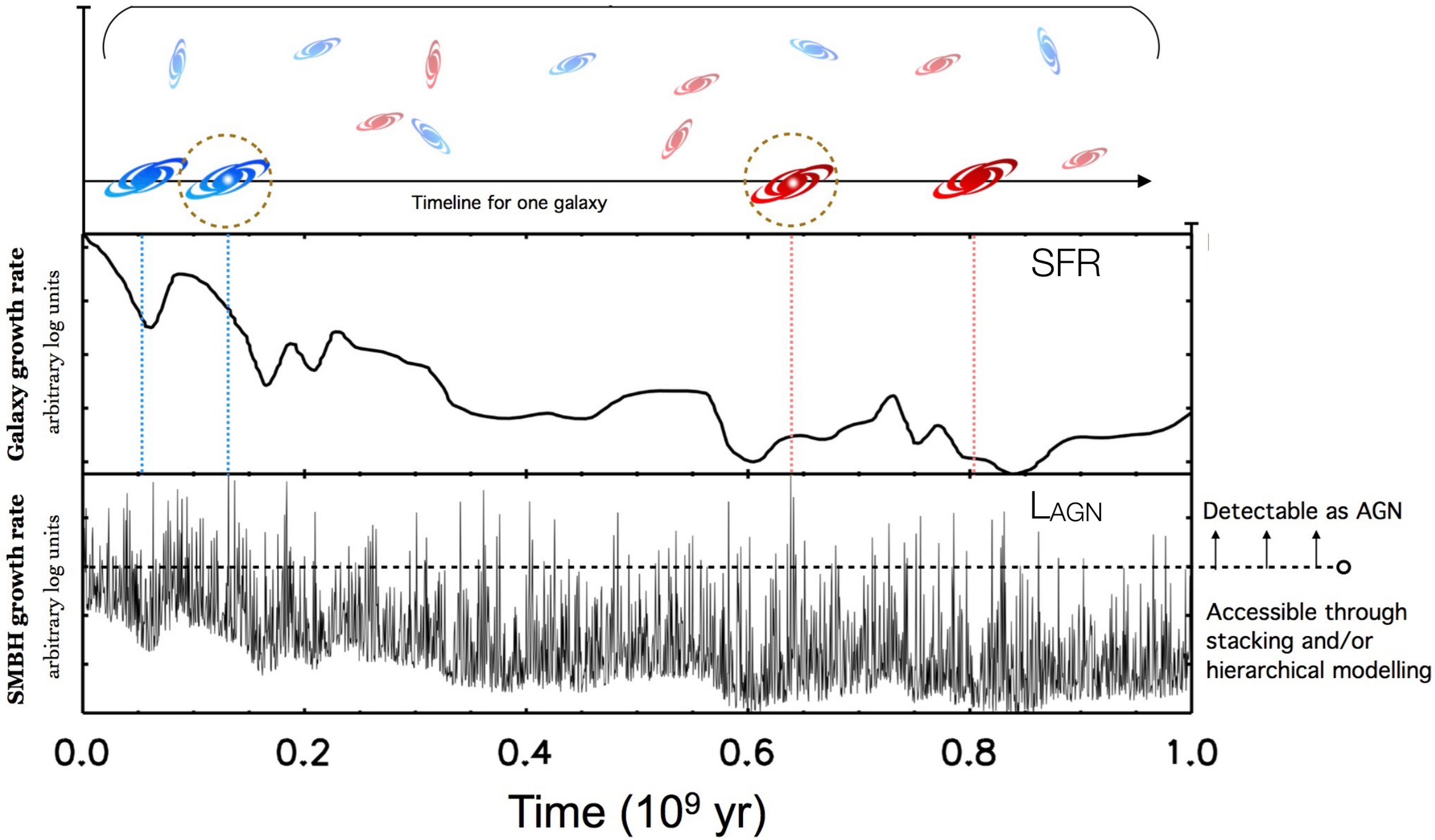
Visual merger-state distributions



Rosario+ (2015)

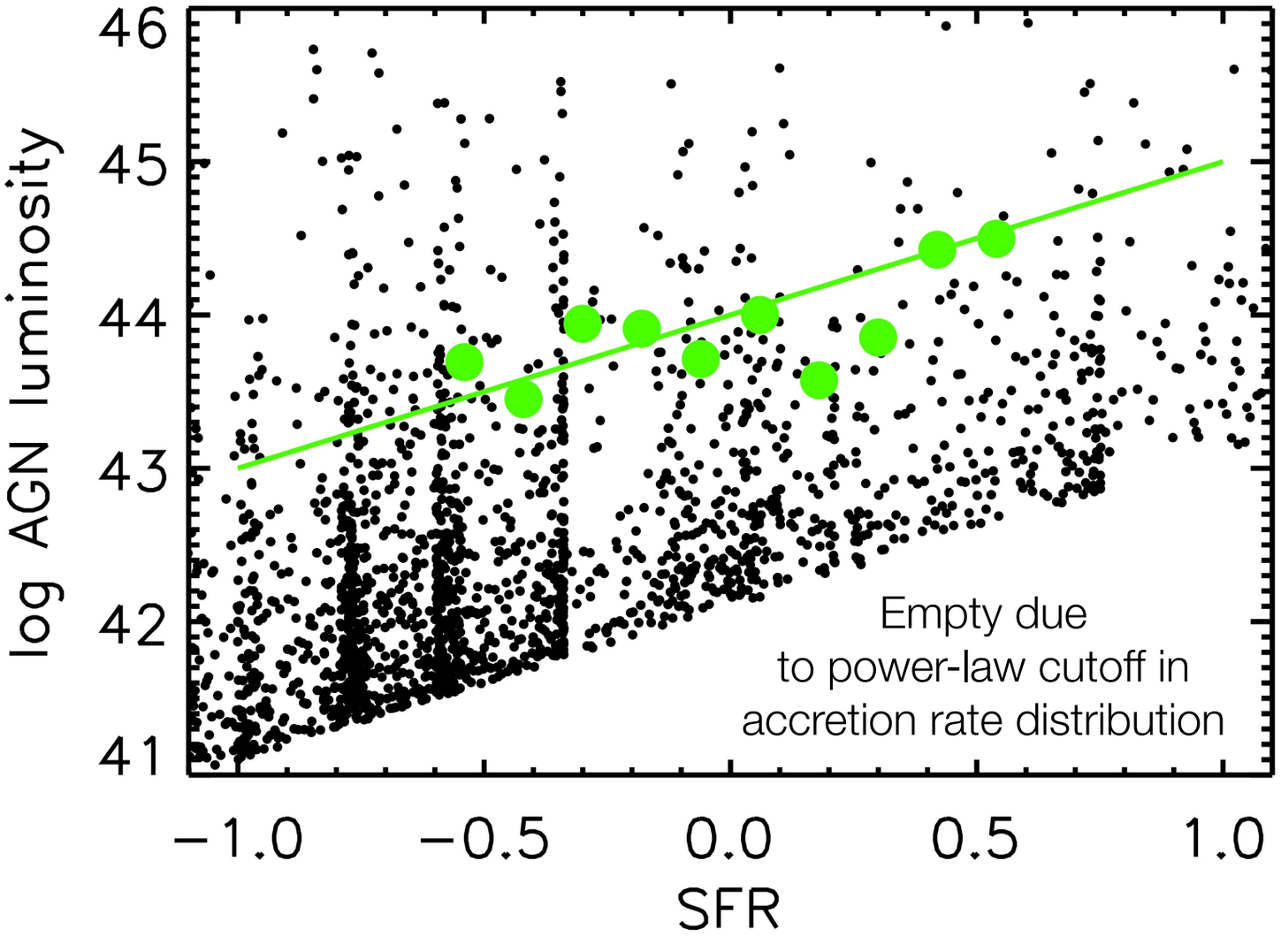
Timescales:
Observable AGN are transients in the lifetime of galaxies

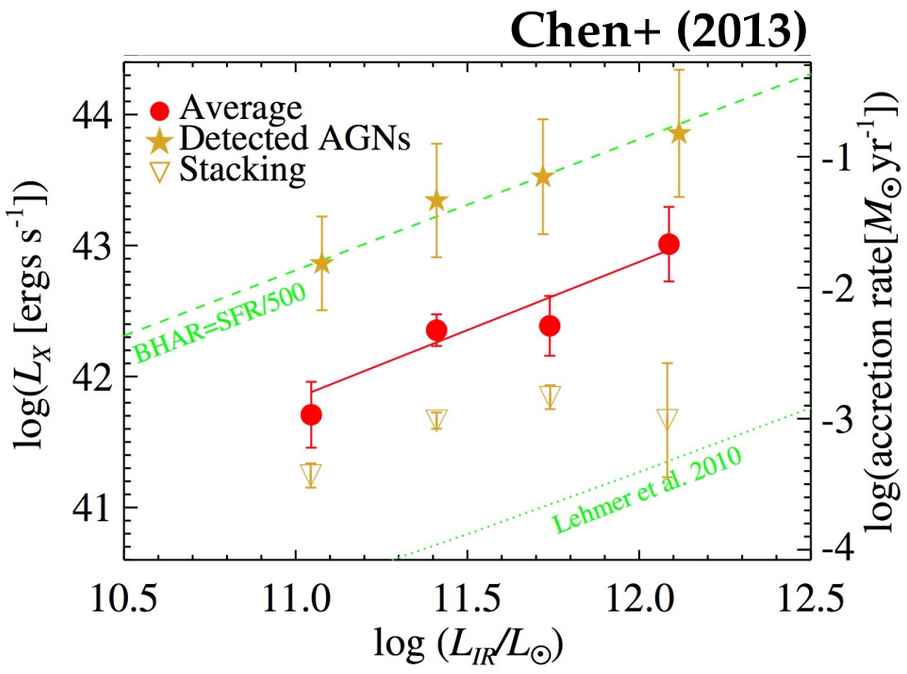
Inspired by Hickox+ (2013)

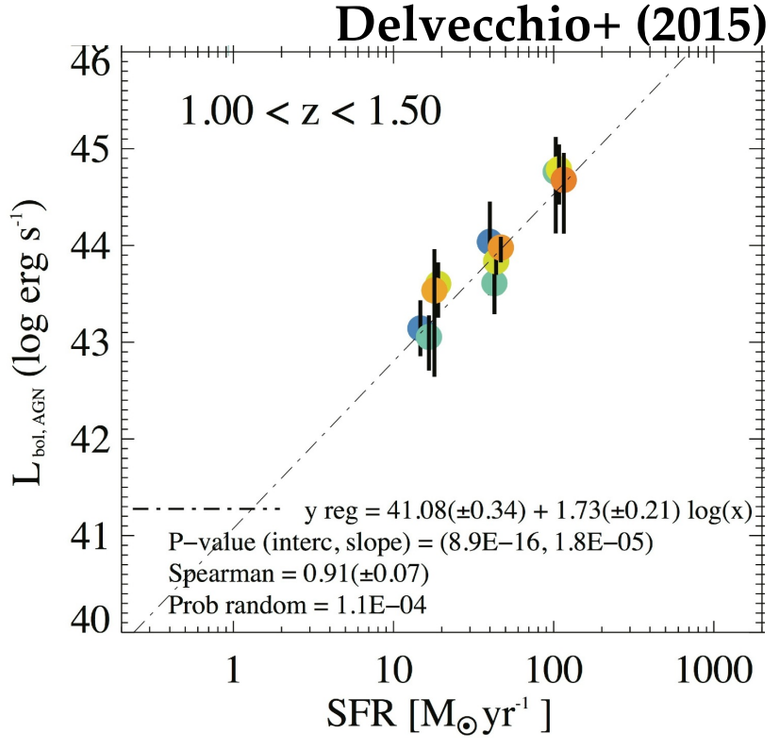


Observational signatures:

Linear increase in the mean accretion rate with SFR

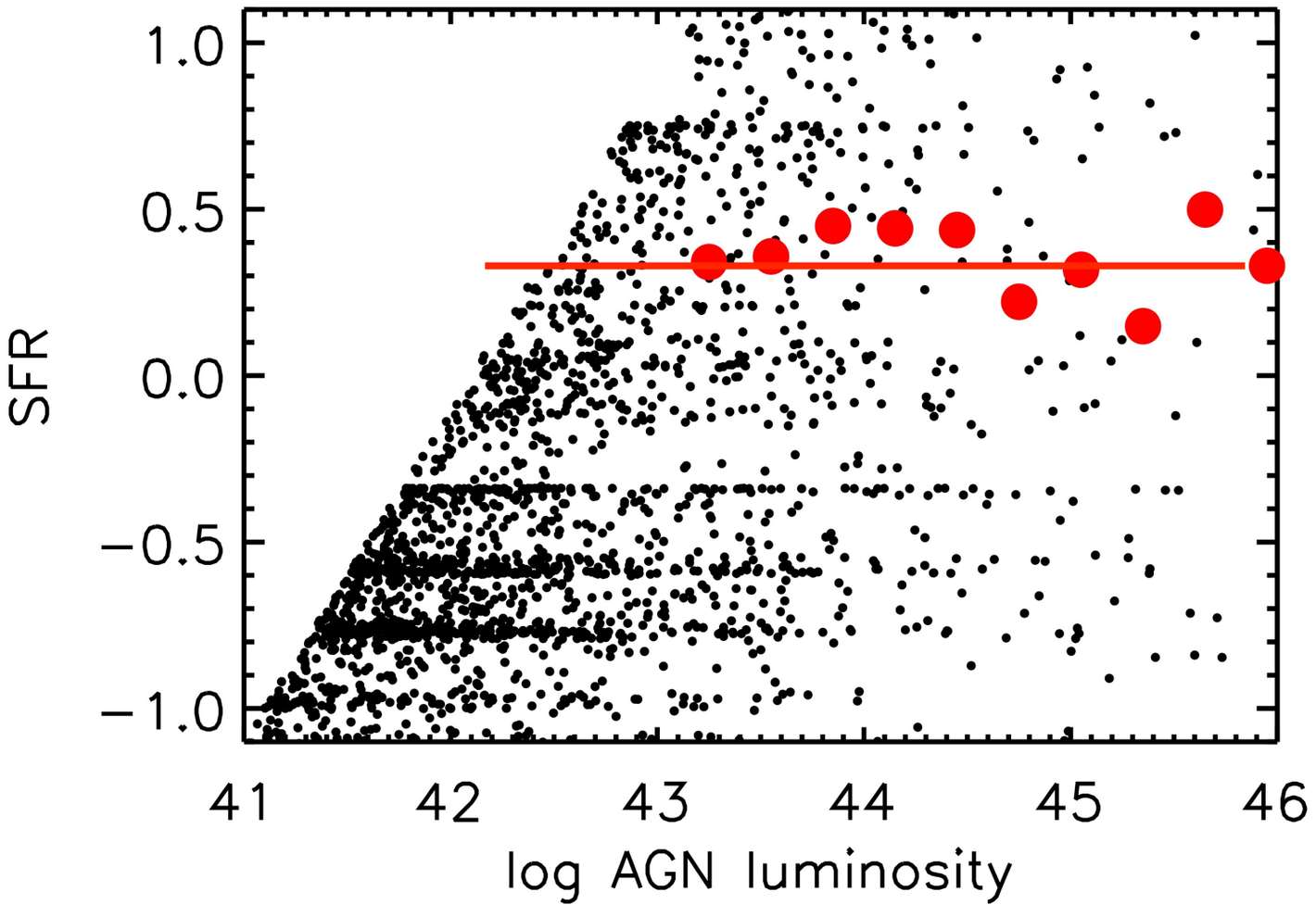




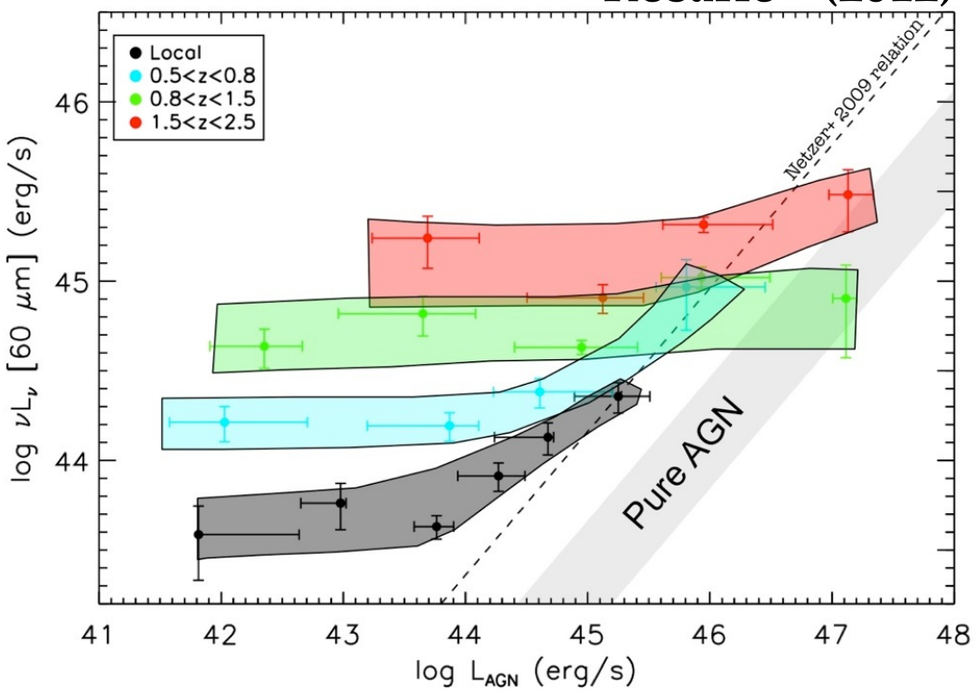


Observational signatures:

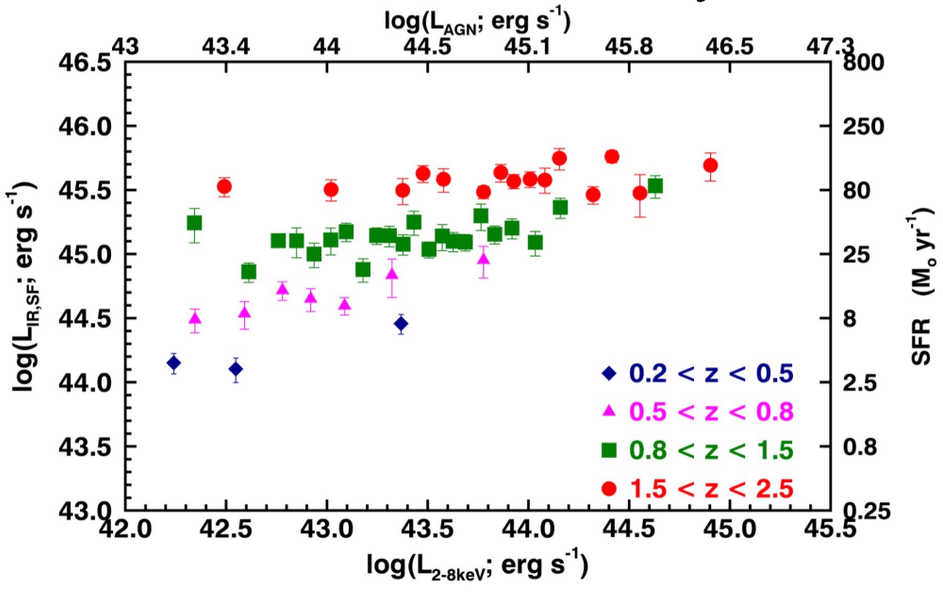
Flat or weak trend of the mean SFR with accretion rate



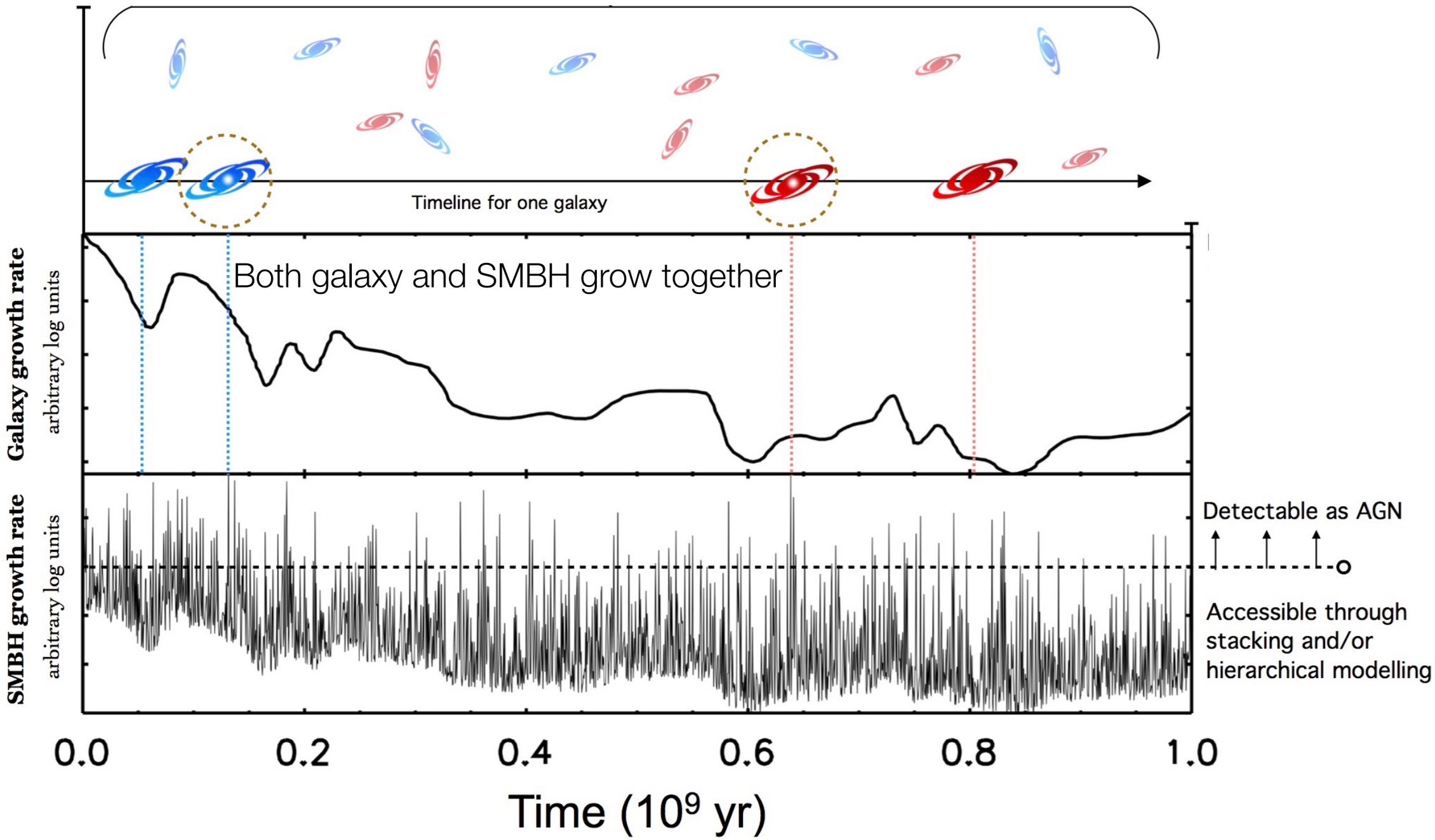
Rosario+ (2012)



Stanley+ (2015)

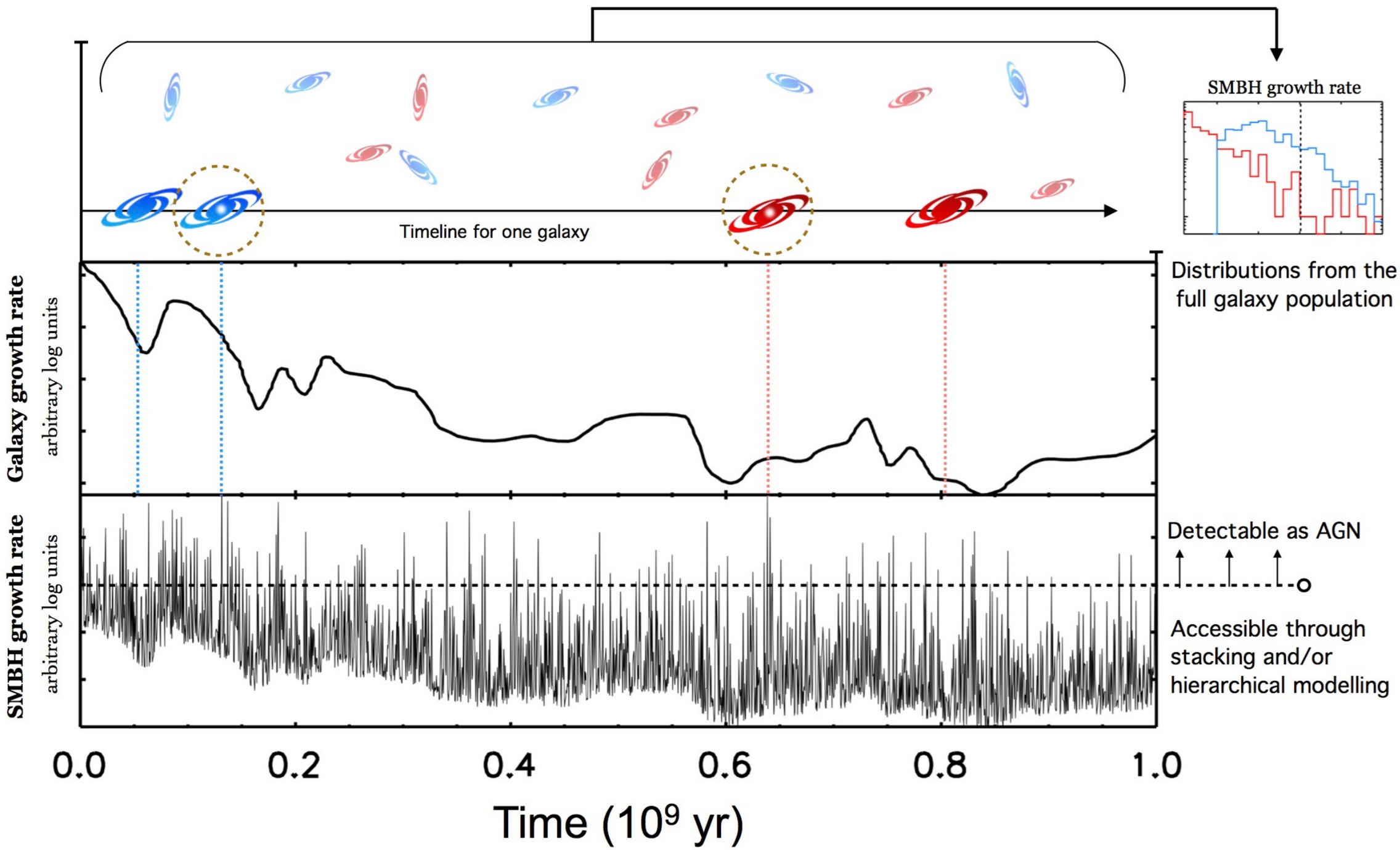


Unsynchronised Co-evolution:
Supply-side economics of the AGN-galaxy connection



Unsynchronised Co-evolution:

Accretion rate distributions give the best insight



Unsynchronised Co-evolution:
Testing a new paradigm in the SDSS/Stripe 82

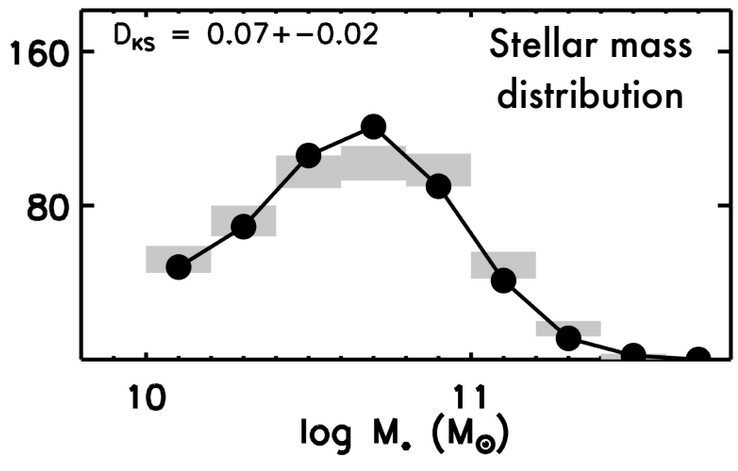
Monte-Carlo model of accretion in star-forming galaxies at z~0.1
Rosario+ (in prep.)

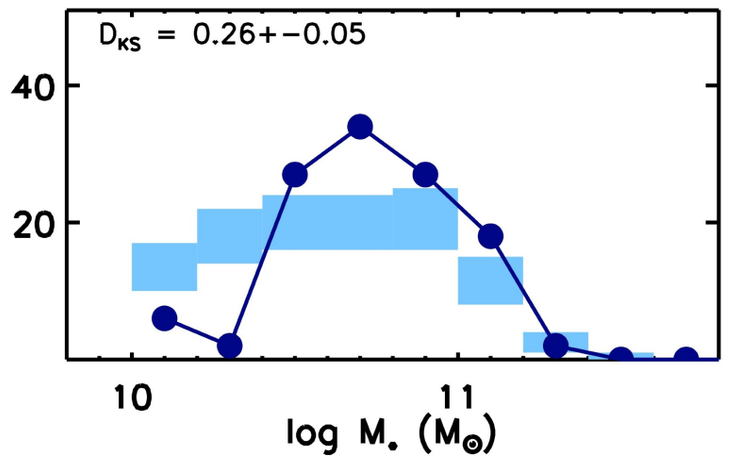
Simulated SF galaxies

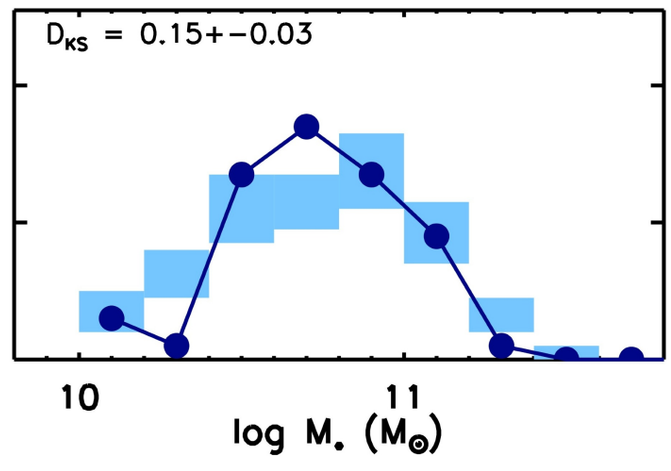
Simulated SF AGN

Fixed accretion rate distribution

SFR-dependent accretion rate distribution

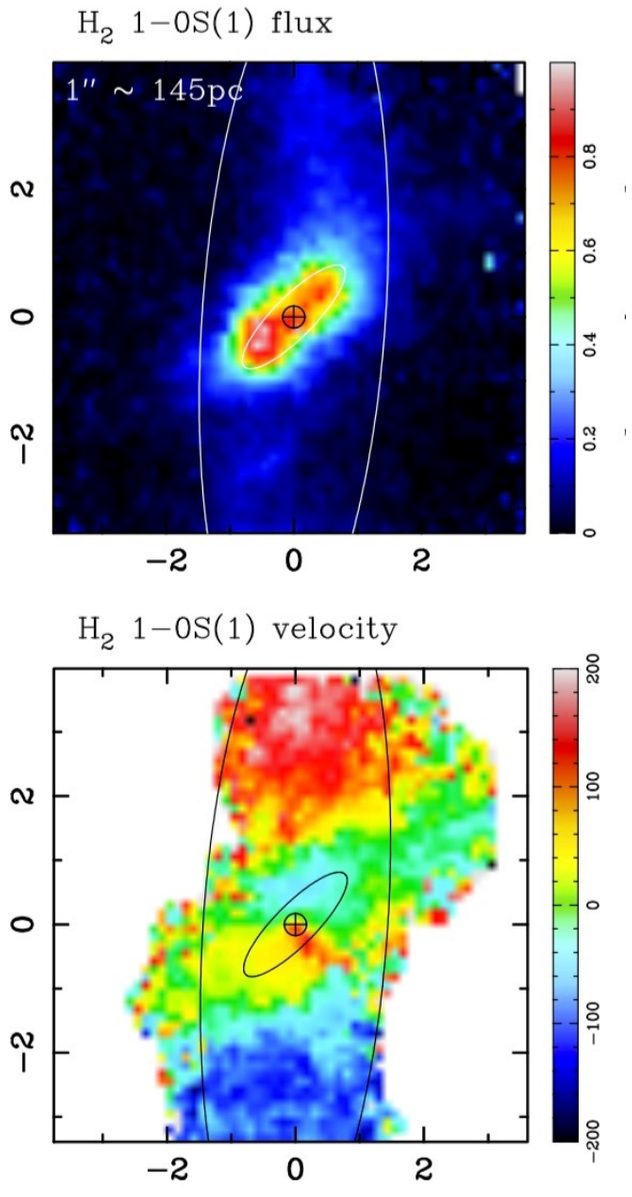






The Future:

The physics of the circum-nuclear regions of galaxies



IC 5267;
Davies+ (2014)

Accretion rate distributions are very likely put into place and modulated by gas flows and feedback (SMBH and SF) in the circum-nuclear environment.

By studying AGN in the full context of the redshift-dependent galaxy population, we can test various processes that affect these distributions.

Q: Do galaxy mergers alter the shape of the accretion rate distributions of nuclear black holes?