A benchmark study of AGN: Decoupling luminosity and evolution in the SEDs of AGN

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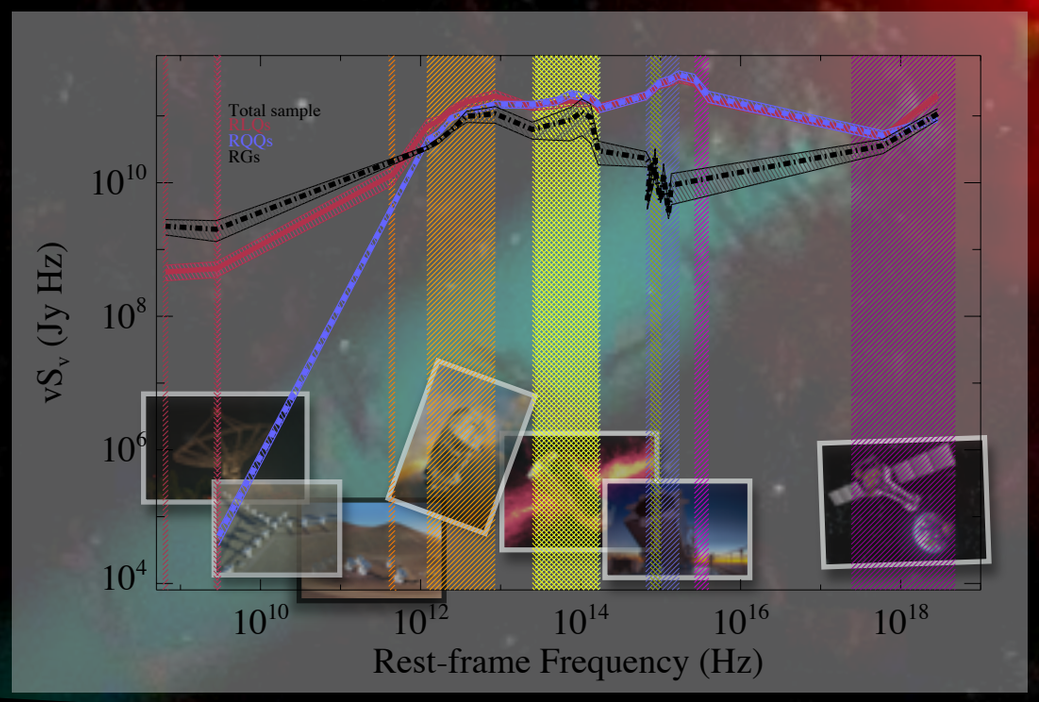
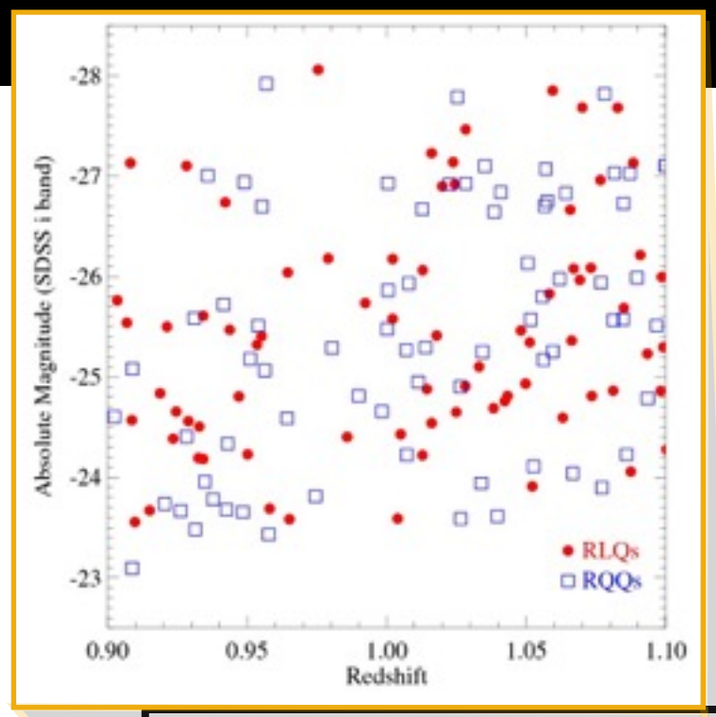
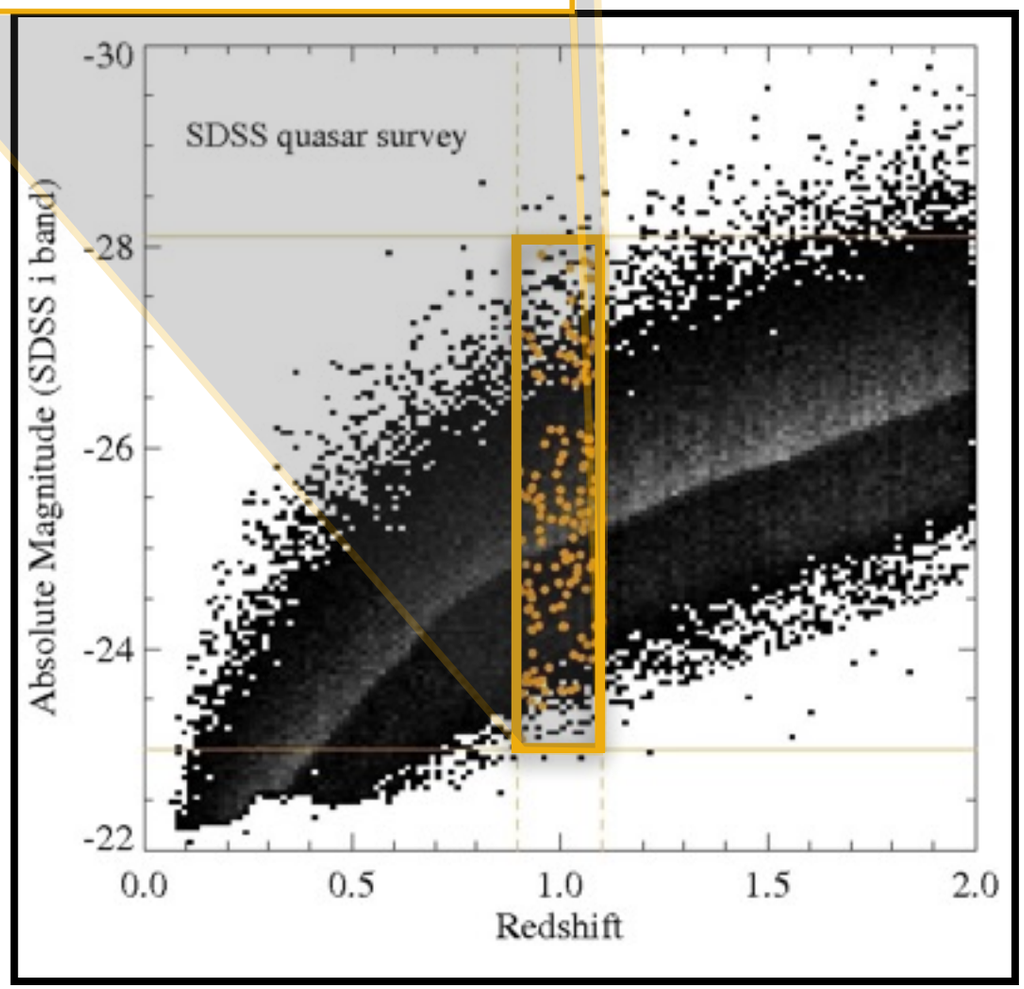


esa

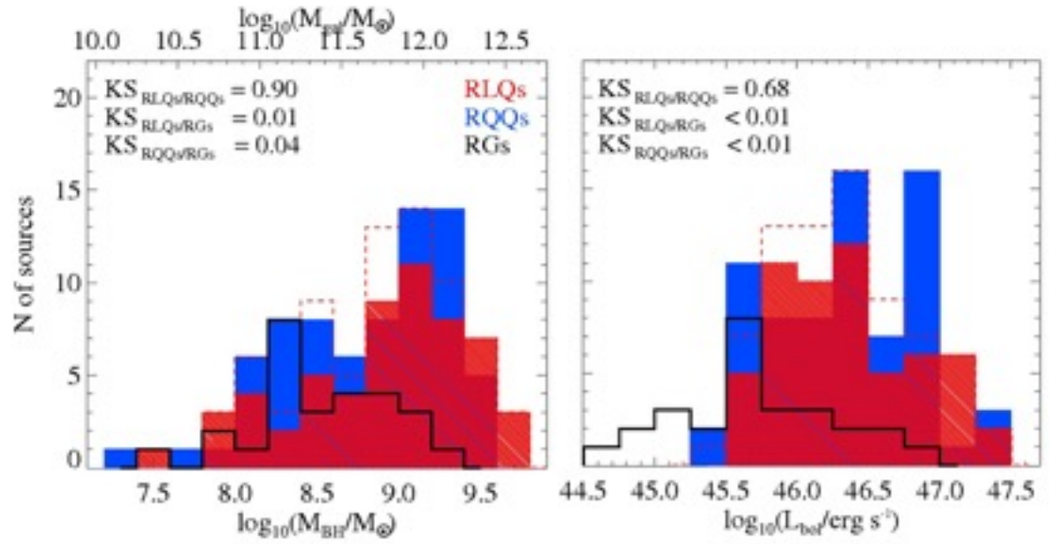
Sample Properties



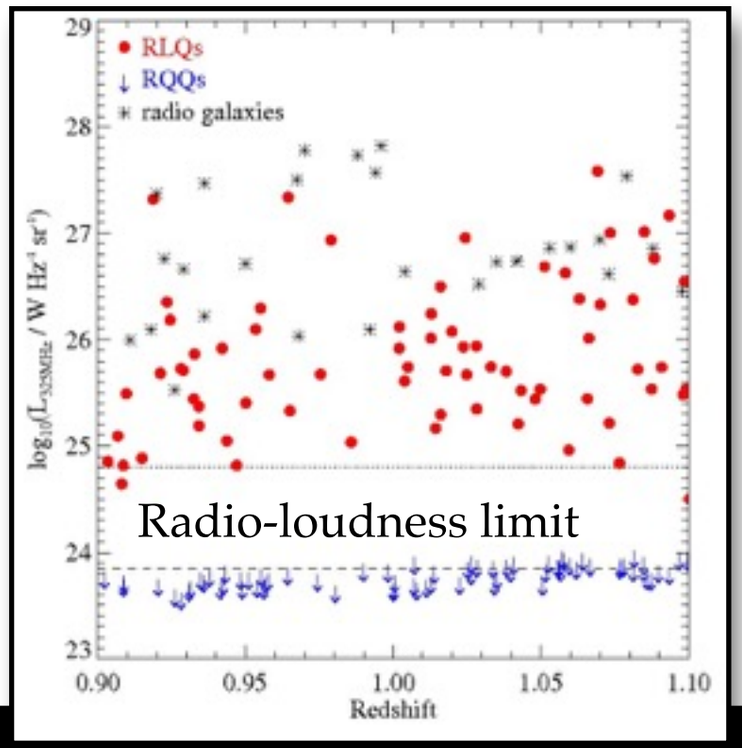


75 RLQs, **71 RQQs** and **27 RGs** at $0.9 < z < 1$, spanning **5 magnitudes**

QSOs are selected from SDSS (broad emission line objects)

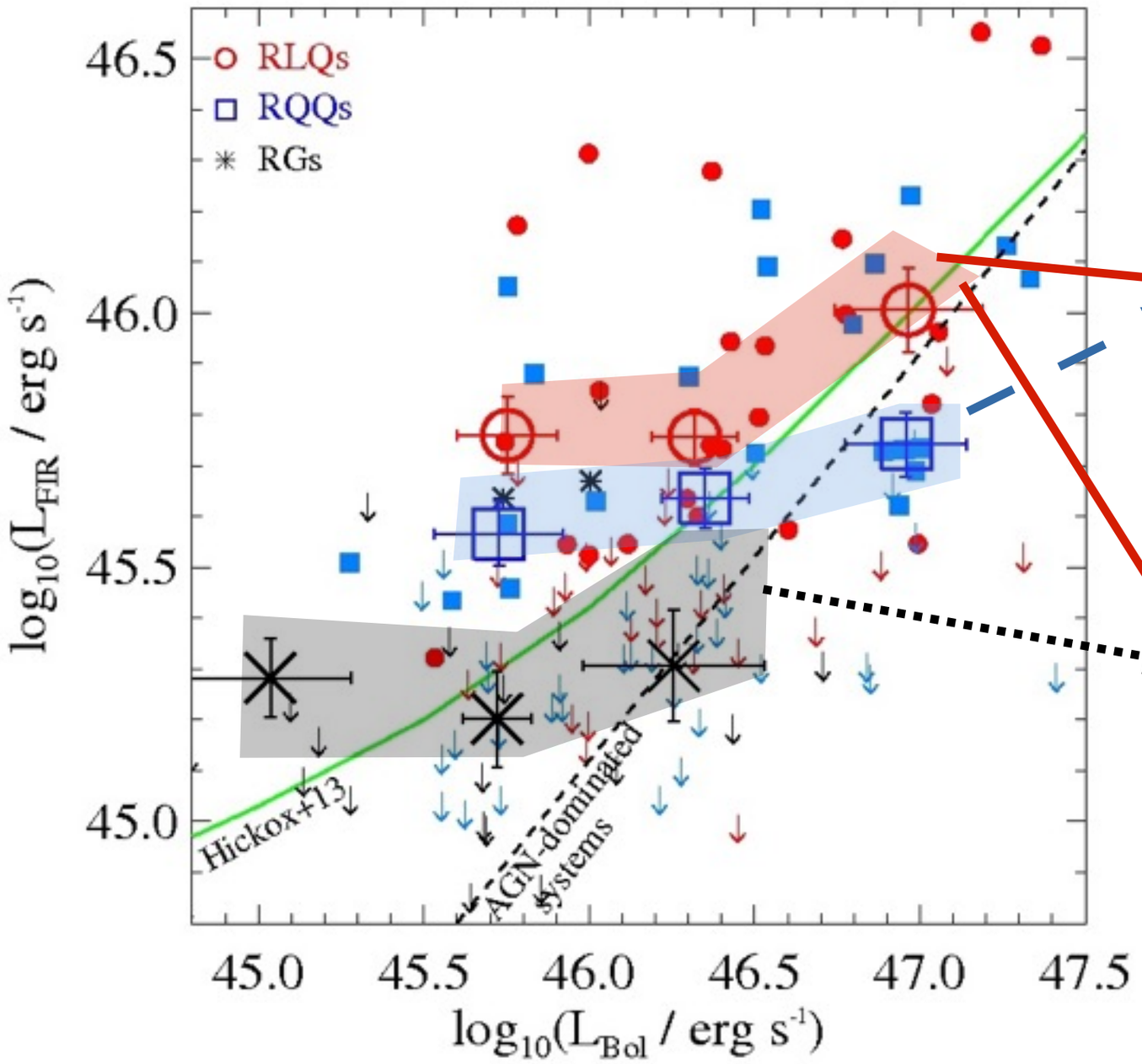


Matched in BH mass and bolometric luminosity



but RGs are more radio power

Observational Evidence for positive and negative AGN feedback



(Kalfountzou et al. submitted 2016, MNRAS)

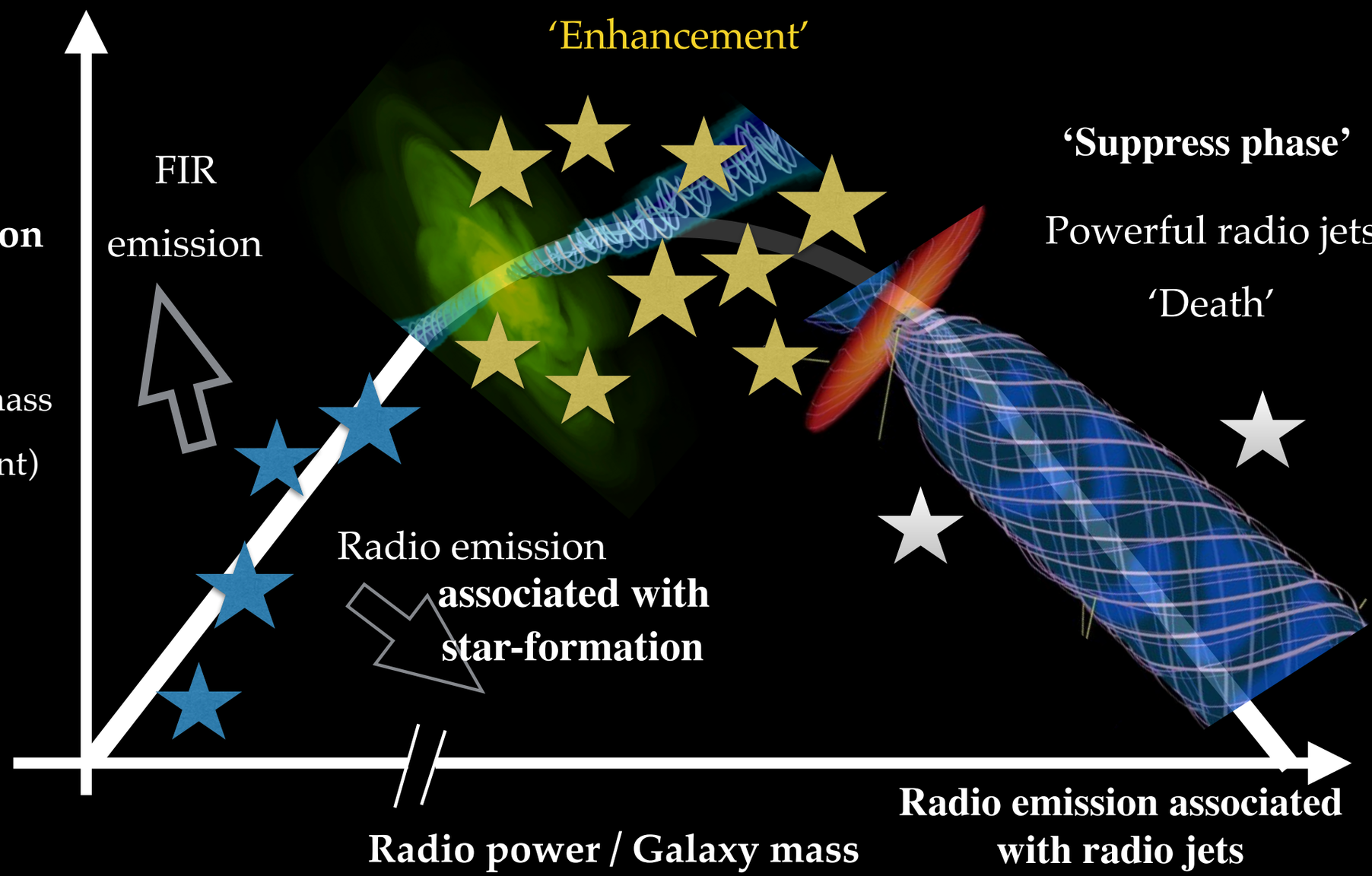
1) the SFR shows a **weak correlation** with the bolometric luminosity for all AGN sub-samples,

2) the **RLQs** show a SFR excess of about a **factor of 1.4** compared to the RQQ sample, suggesting that either ***positive radio-jet feedback*** or ***radio AGN triggering*** are ***linked*** to ***star-formation triggering*.**

3) **RGs** have lower SFRs by a **factor of 2.5** than the **RLQ** sub-sample with the same BH mass and bolometric luminosity.

If RLQs and RGs are the same objects, why RGs have much lower SFR for the same BH mass?

The Toy Model

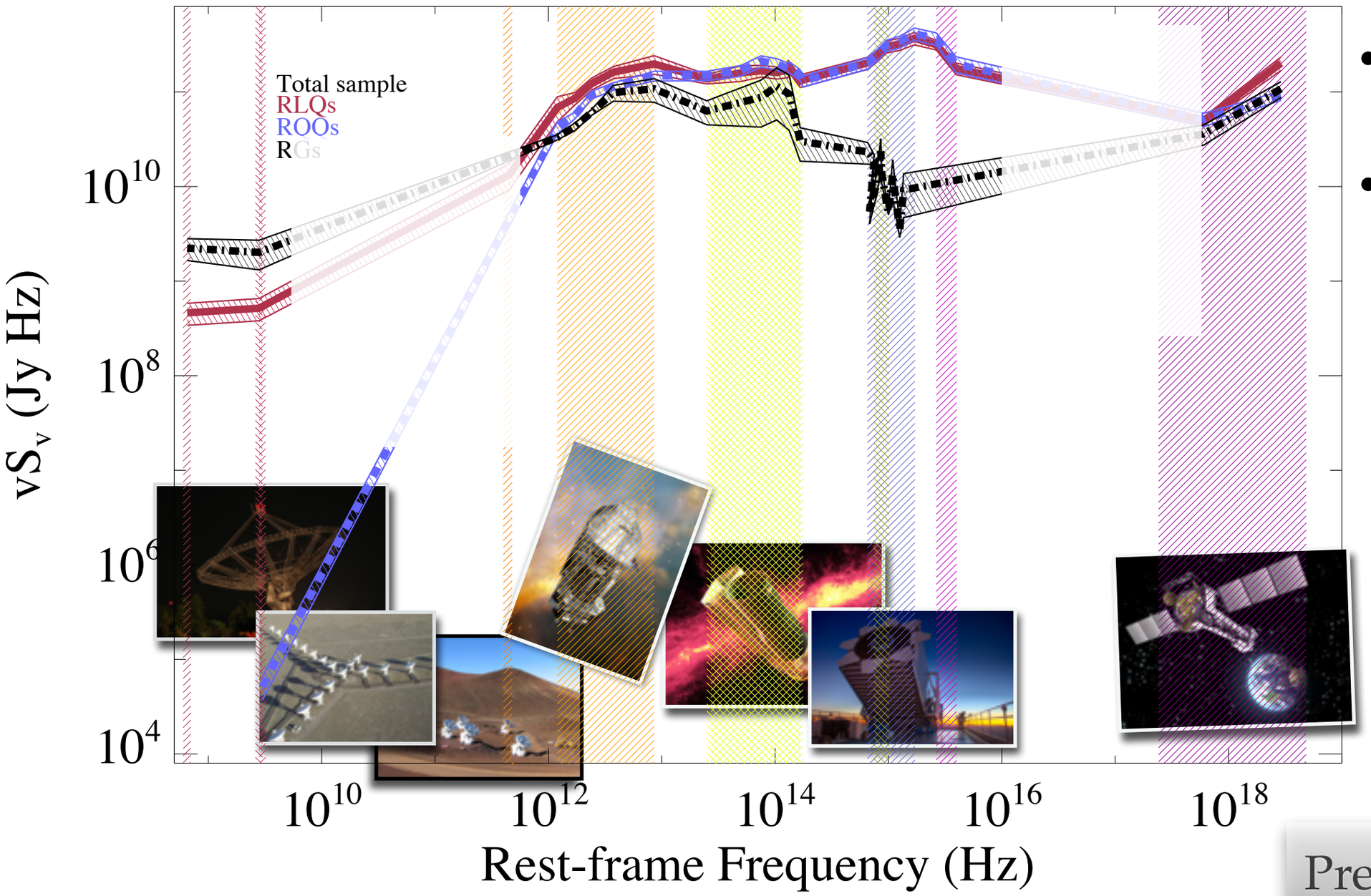


- We suggest that there is some **jet power threshold** at which **radio-jet feedback** **switches** from enhancing star formation (by compressing gas) to suppressing it (by ejecting gas).
- This threshold **depends** on both *galaxy mass* and *jet power*. (e.g. see peak of the model and the break points)

A New QSO SED library from X-ray to Radio

JVLA SMA *Spitzer* SDSS OM-X-ray

GMRT FIRST/NVSS *Herschel* UKIDSS GALEX XMM / SWIFT



- Comparison with previous works
- Estimate bolometric correction factors

And all without observation and selection biases, using a uniform QSO sample

Preliminary

Kalfountzou et al. in prep.

Conclusions

- **Powerful QSOs at a single redshift epoch**
  - Weak correlation between BH and galaxy growth
  - Evidence for recent merger events
- **Radio-jets can enhance star-formation**
  - RLQs show a SFR excess of a factor of 1.4 compared to RQQs, matched in black hole mass and AGN luminosity
- **BUT, radio-galaxies have lower SFRs by a factor of 2.5 than RLQs.**
  - We suggest that there is a jet power threshold at which radio-jet feedback switched from enhancing star formation to suppressing it. We expect that this threshold depends on both galaxy mass and jet power.
- **Construct a single epoch AGN SED library to understand quasars' physics.**