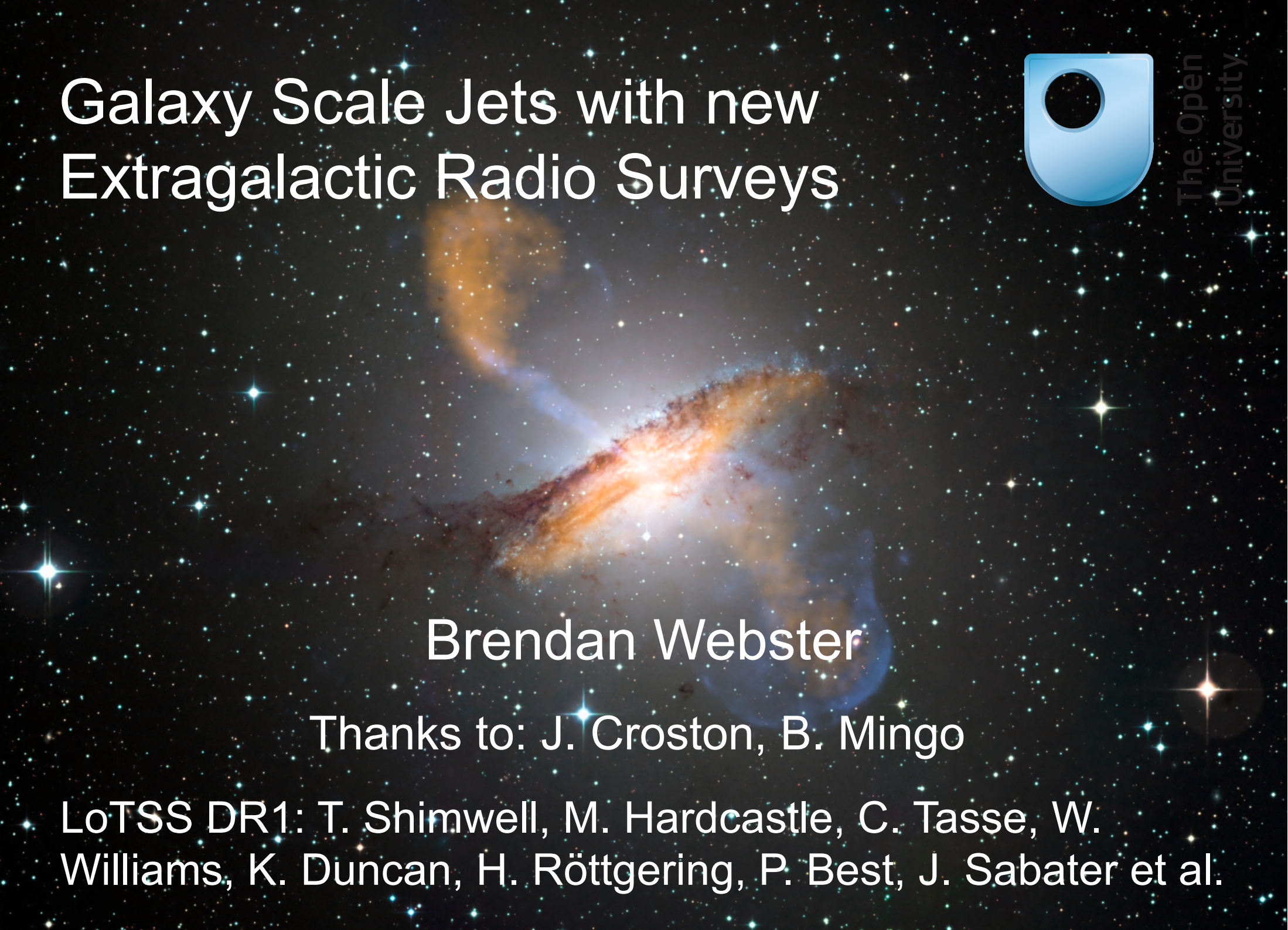
Galaxy Scale Jets with new Extragalactic Radio Surveys



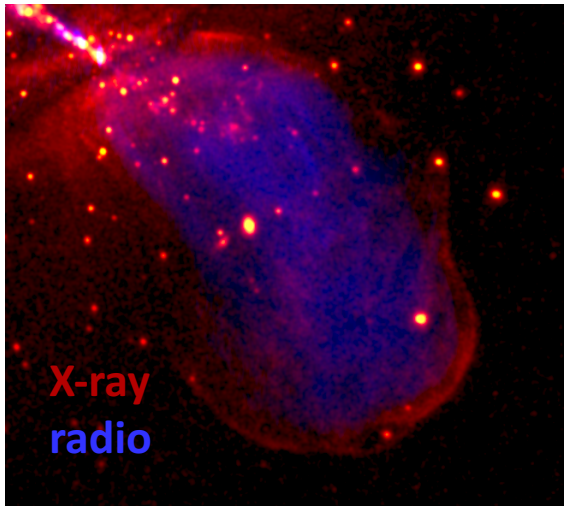
Brendan Webster

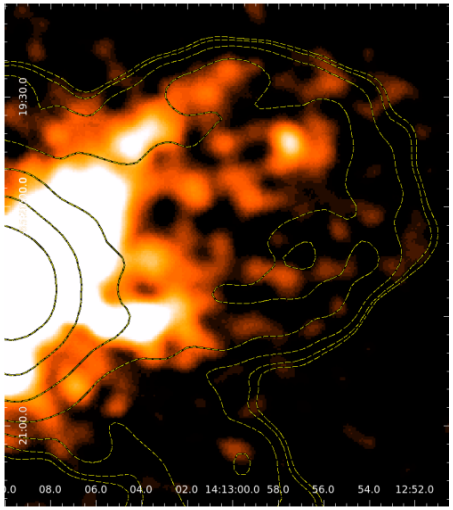
Thanks to: J. Croston, B. Mingo

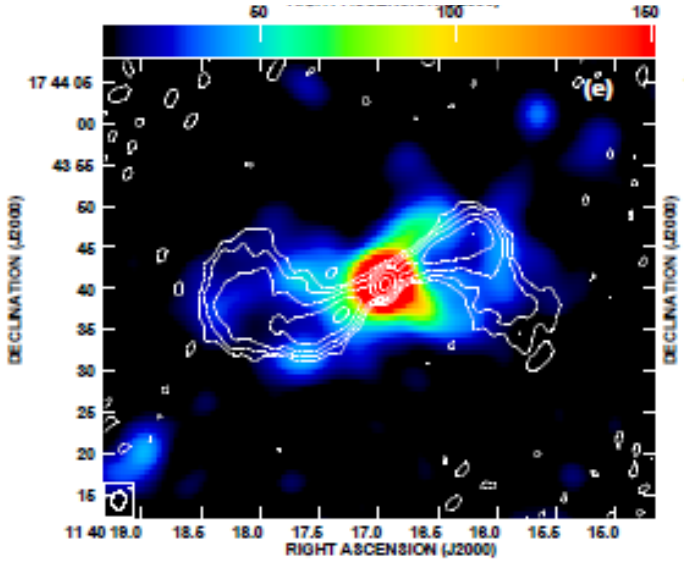
LoTSS DR1: T. Shimwell, M. Hardcastle, C. Tasse, W. Williams, K. Duncan, H. Röttgering, P. Best, J. Sabater et al.

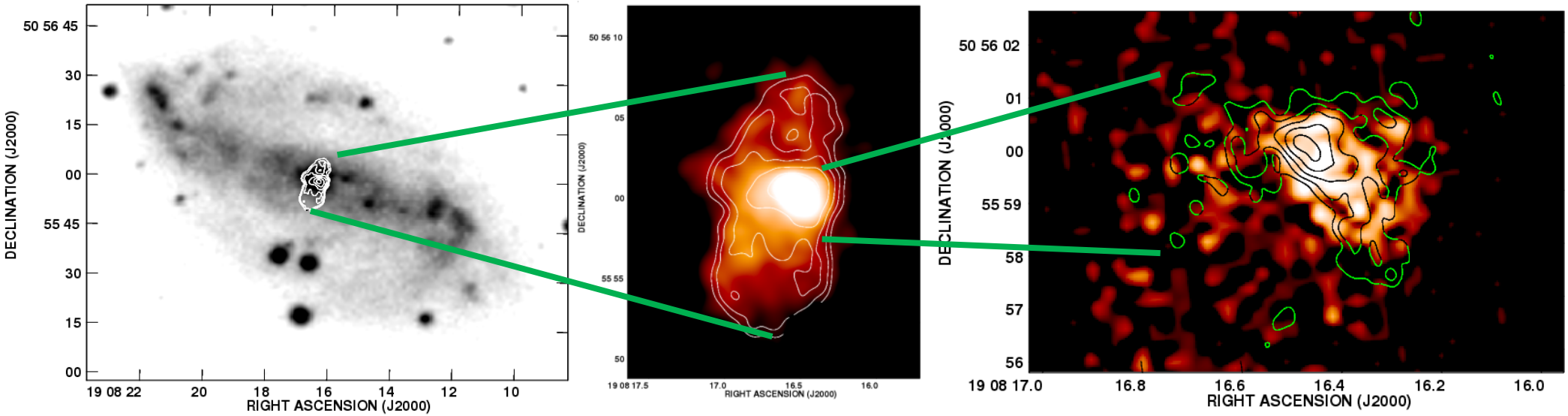
AGN Feedback

Motivation









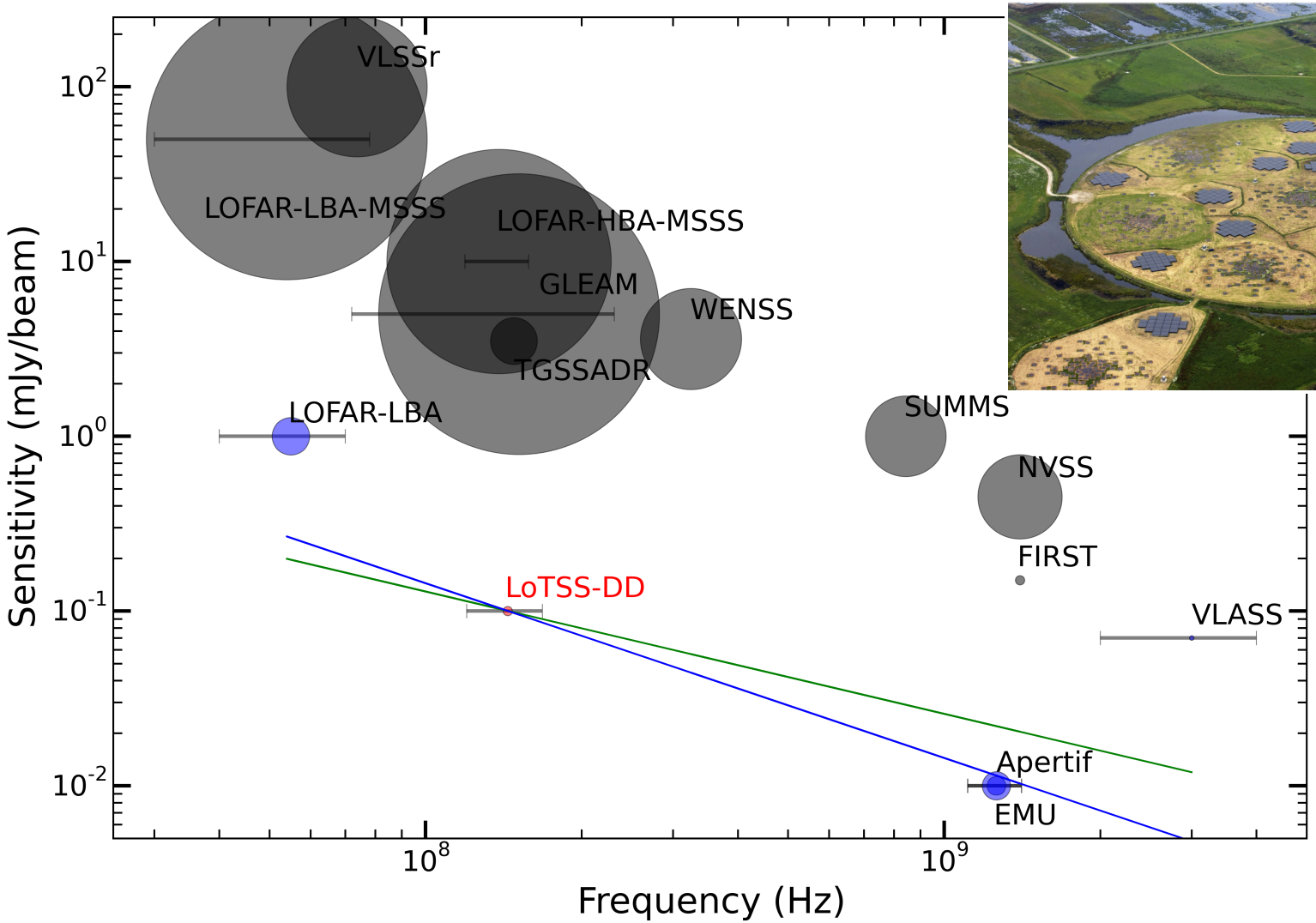
Croston+ (2009) MNRAS 395 1999, Croston+ (2007) ApJ 660 191, Heesen+ (2014) MNRAS 439 1364, Croston+ (2008) ApJ 688 190

Motivation

The Open University

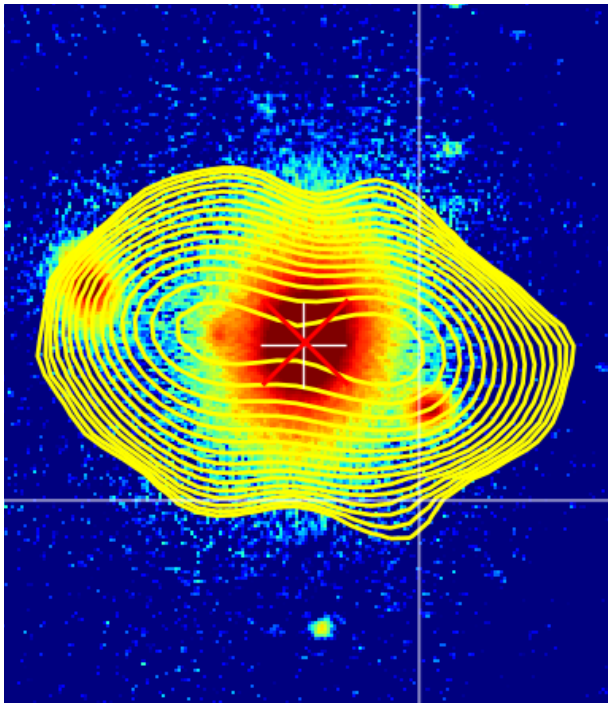
- How common are GSJ?
- What type of galaxies host GSJ?
- What environments host GSJ?
- How do GSJ fit into the overall AGN life cycle?
- Can GSJ Feedback effect the Host Galaxy's Evolution?
- Can GSJ Generate Shocks?

LOFAR

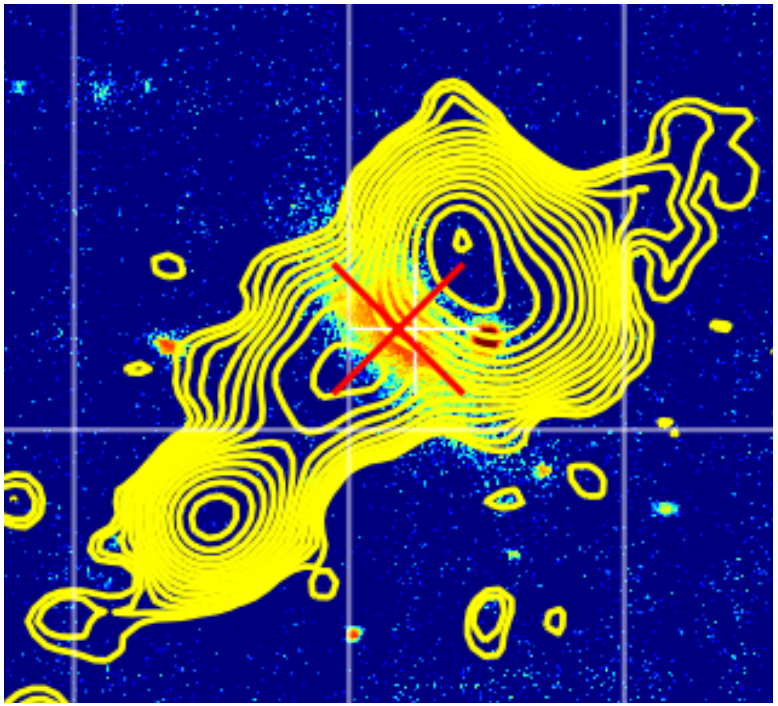


Shimwell+ (2016)

Identifying GSJ



ILTJ145604.90+472712.1



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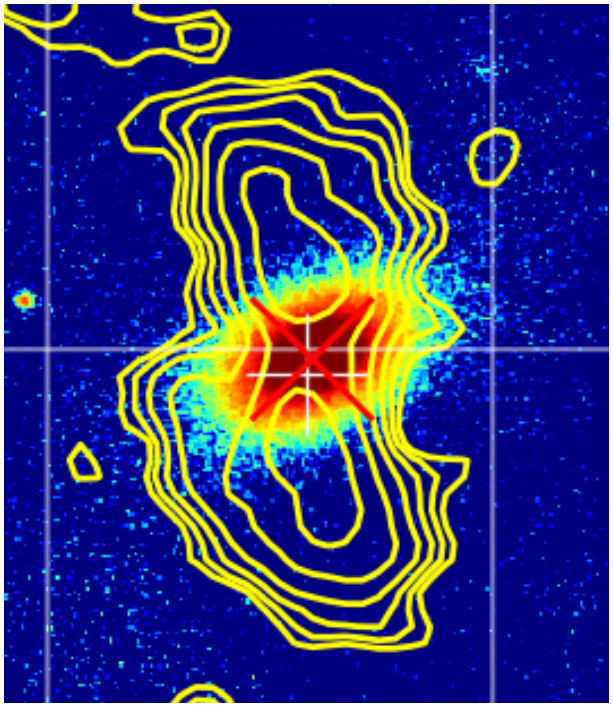
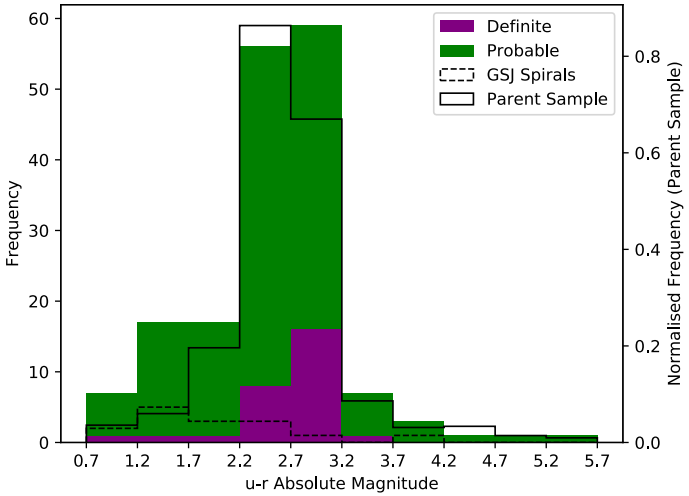
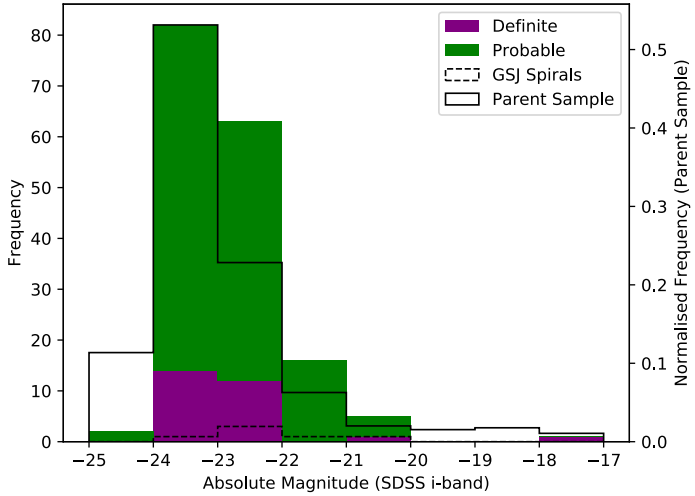


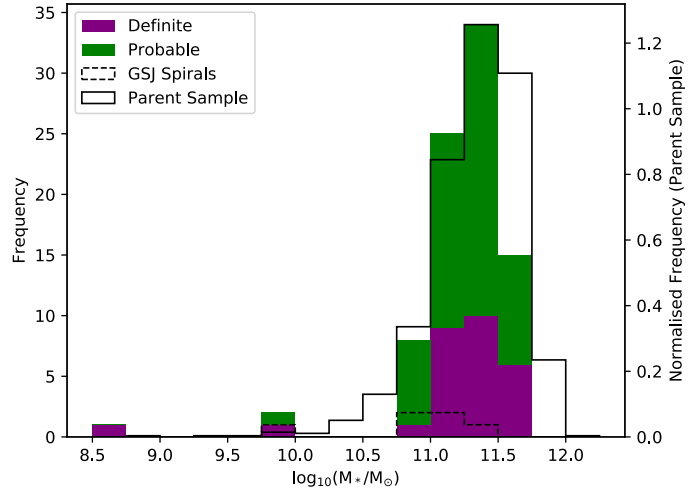
ILTJ122037.67+473857.6

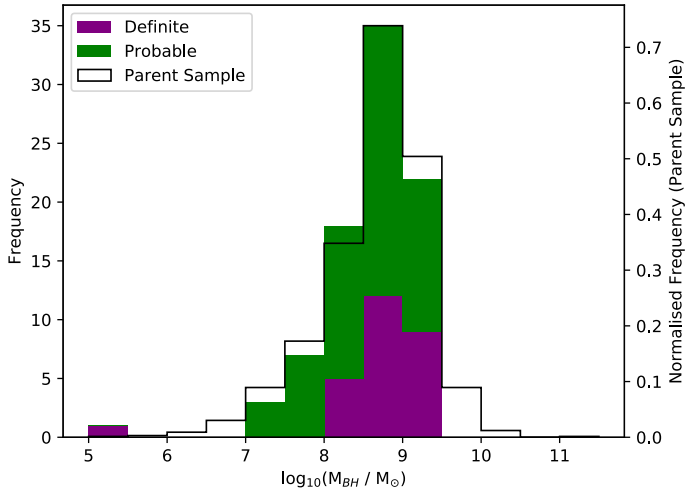
- Redshift < 0.4
- Jet upper size limit of 40kpc
- Compare with AGN catalogue of Hardcastle+ (2019)

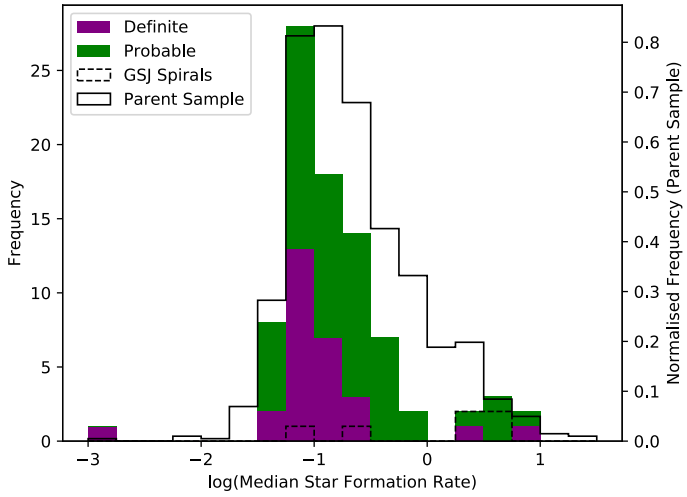
Host Properties

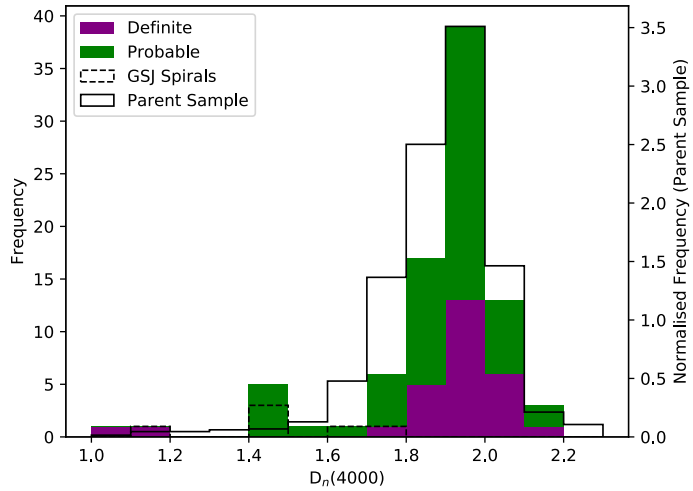






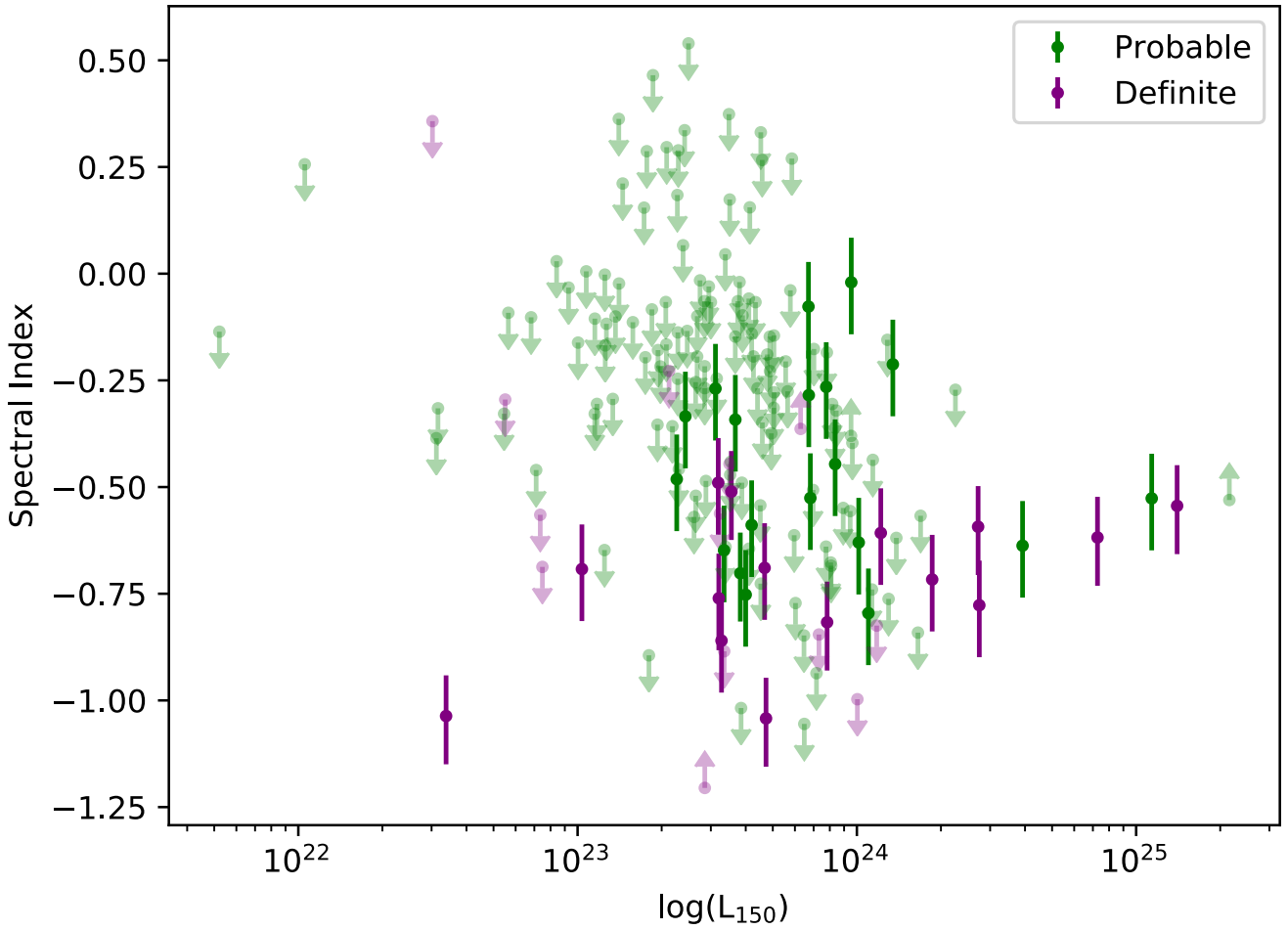






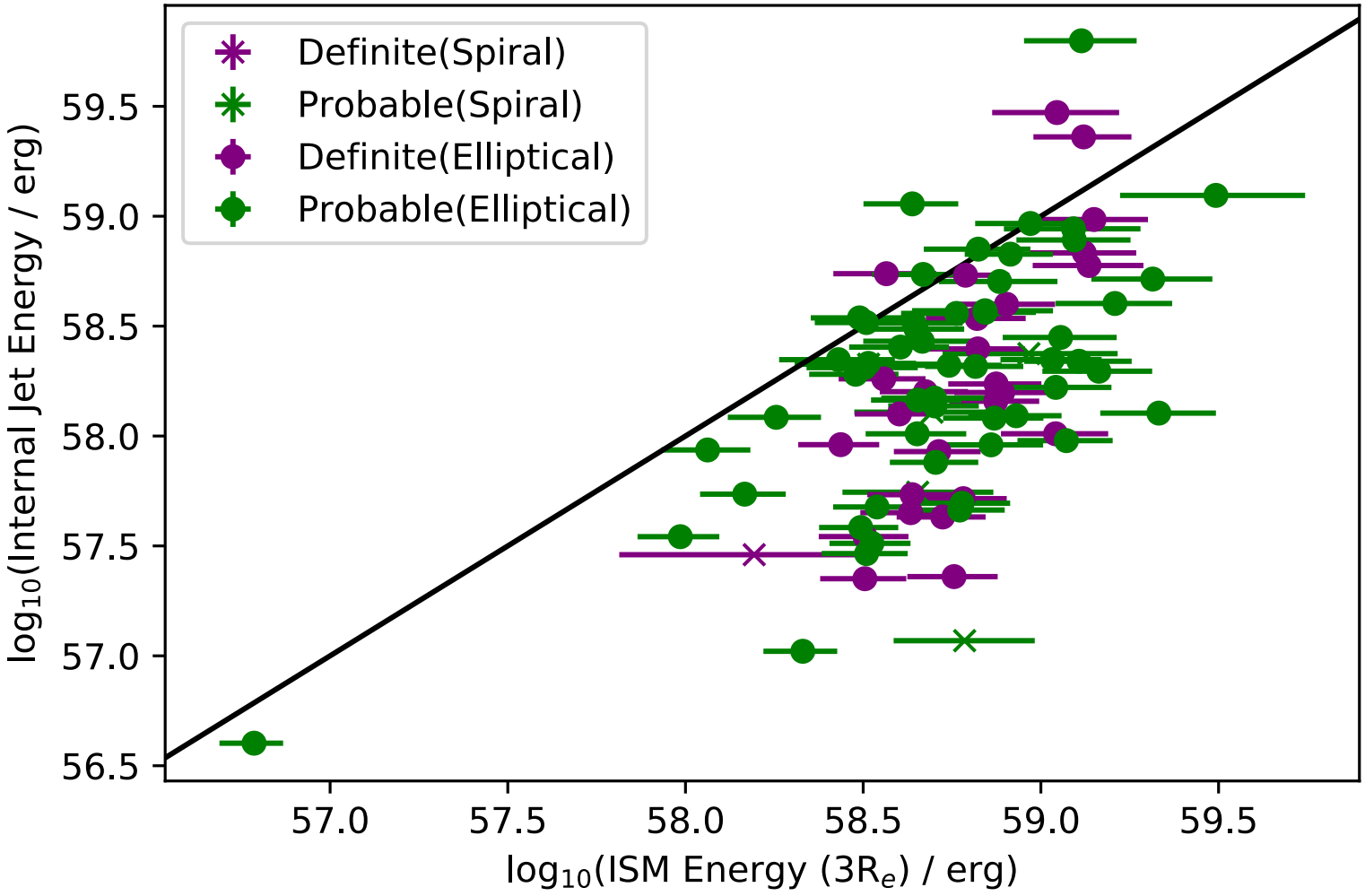
- GSJ hosts are typical of ‘ordinary’ AGN
- Large Number (5 to 10%) of Spiral Hosts

Spectral Indices



- Average Spectral Index typical for AGN
- Many GSJ appear young

Energetics



- GSJ can affect their own host galaxy's evolution

Conclusions

- First large sample of 169 GSJ
- GSJ are ordinary AGN
- GSJ are capable of directly affecting the host's evolution
- GSJ are observed in sparse groups
- GSJ have varied morphology
- An unusually high number of GSJ are hosted by spirals

Next Steps

- Analyse High Resolution VLA Radio Data (in progress)
- Use X-Ray Data to study GSJ environments

VLA Images