ICRAR

International Centre for Radio Astronomy Research

ASKAP and MWA Synergy:
A new Era of Broadband Radio Astronomy

Nick Seymour – SPARCS 2015 – 1st July2015

Curtin University

The Government of Western Australia

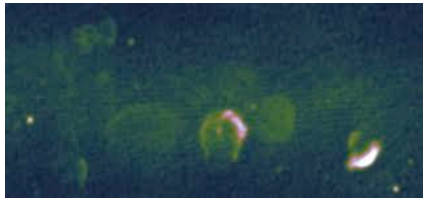
The University of Western Australia

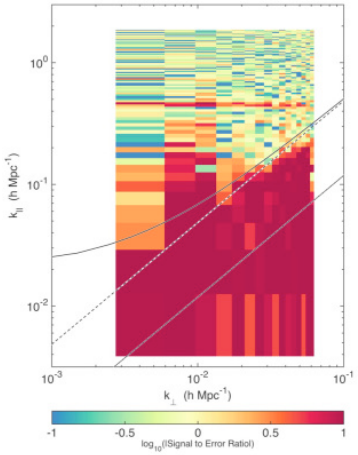
MWA in a Nutshell

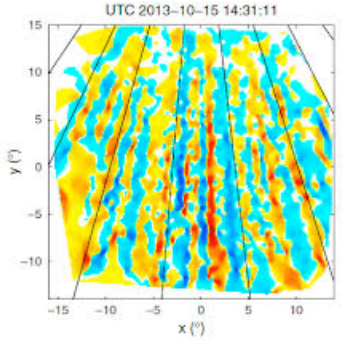
- 2048 dual polarisation dipoles
- Optimised for 80-300MHz
- 128 tiles (4x4 dipoles)
- Pointing electronic not mechanical
- Very wide field-of-view

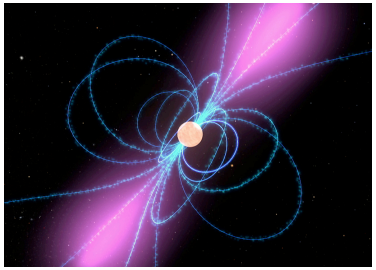
- Baselines up to 3km
- 8128 baselines
- Stokes (I,Q,U,V)
- Located at Murchison Radio Observatory
- International coll (Aus, Ind, NZ and US)

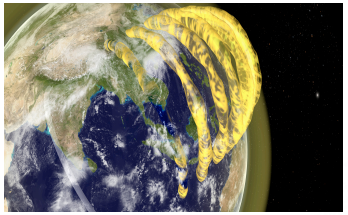
MWA Science

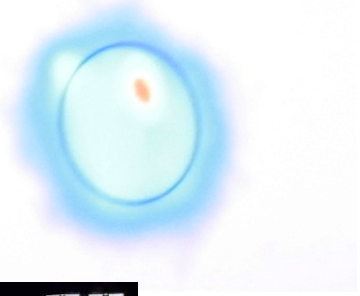


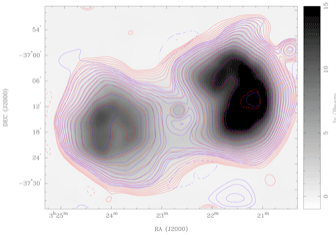


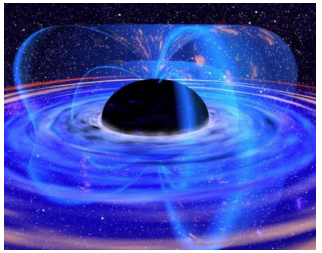


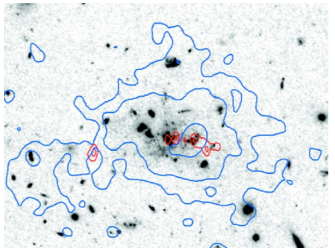






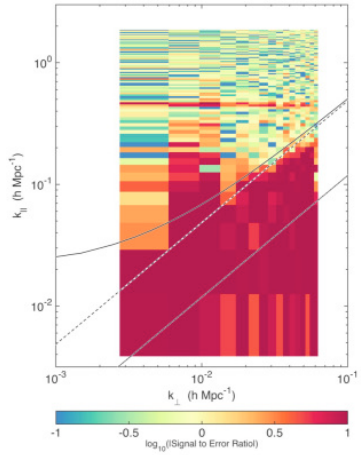


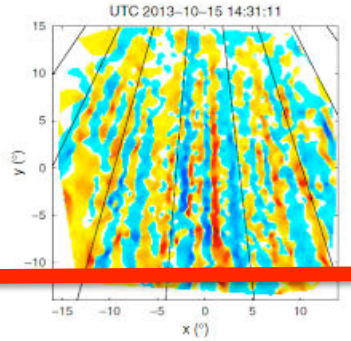


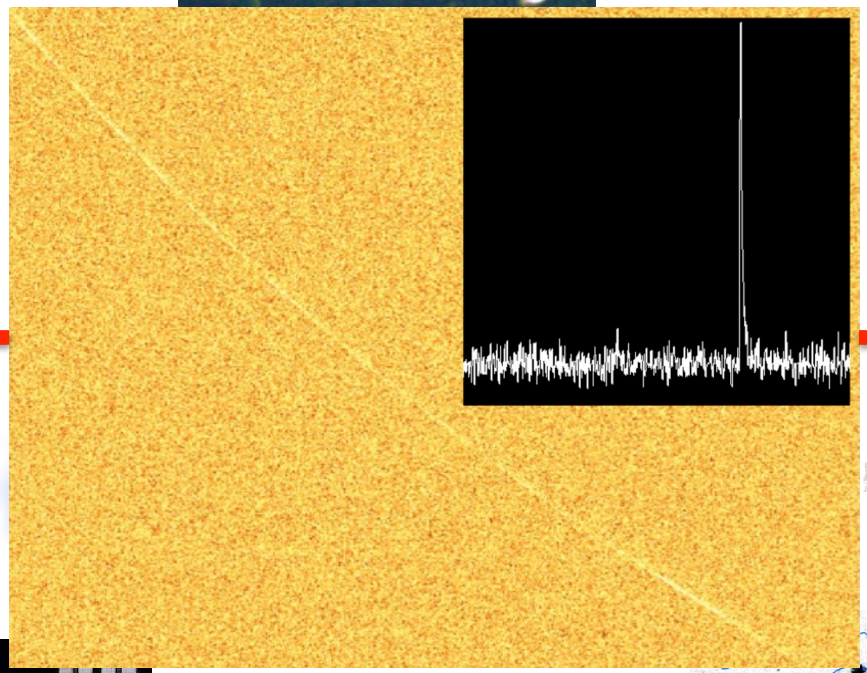


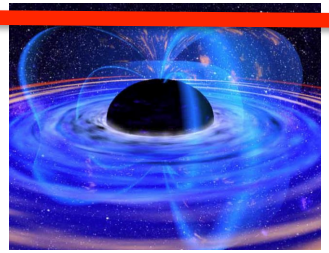
Log distance

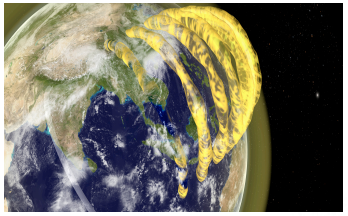
MWA Science

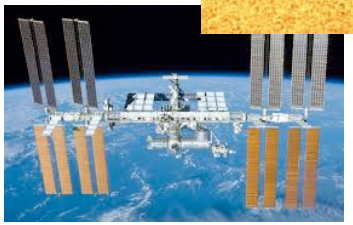


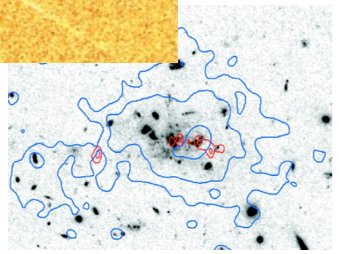












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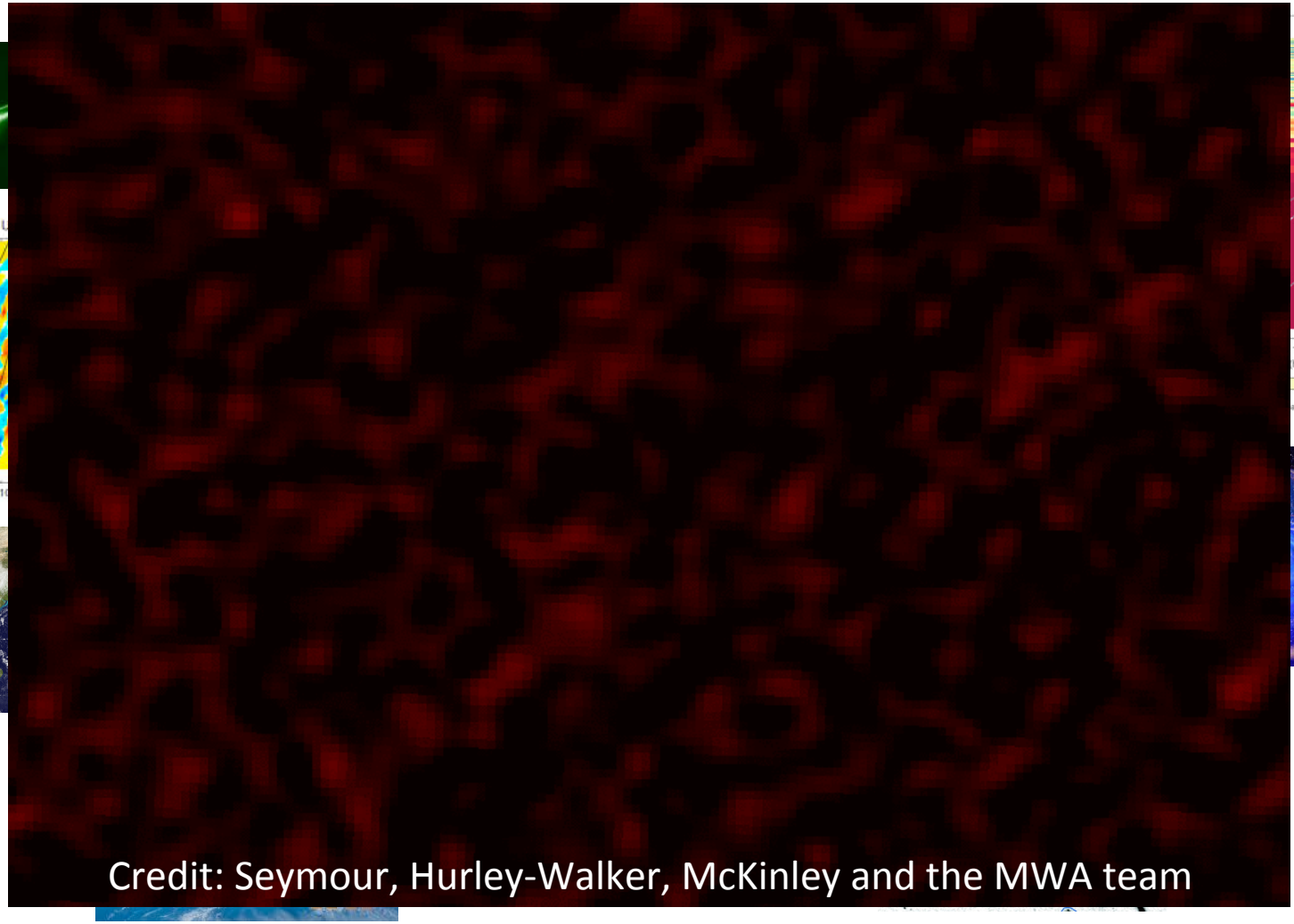


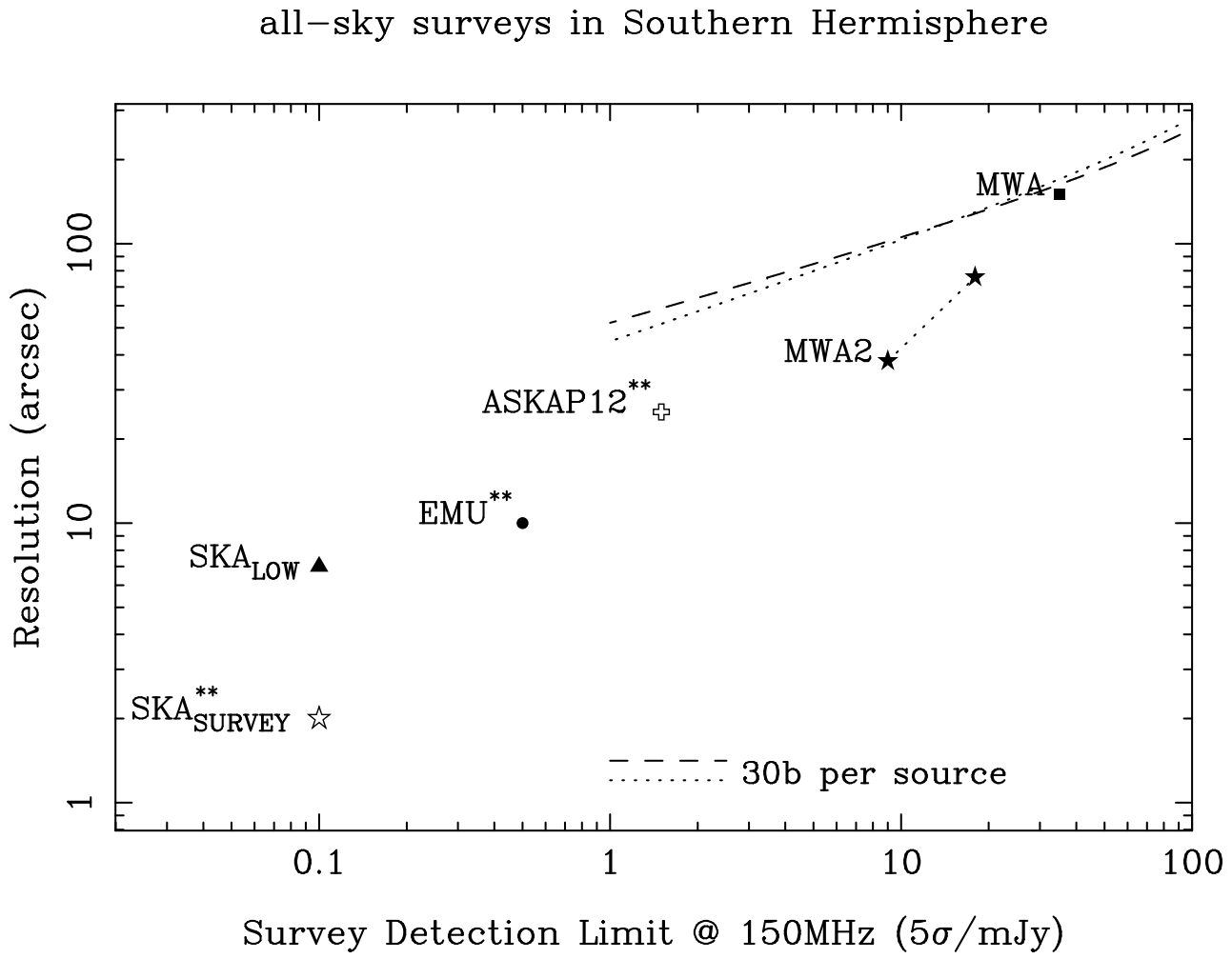
Credit: Seymour, Hurley-Walker, McKinley and the MWA team

Log distance

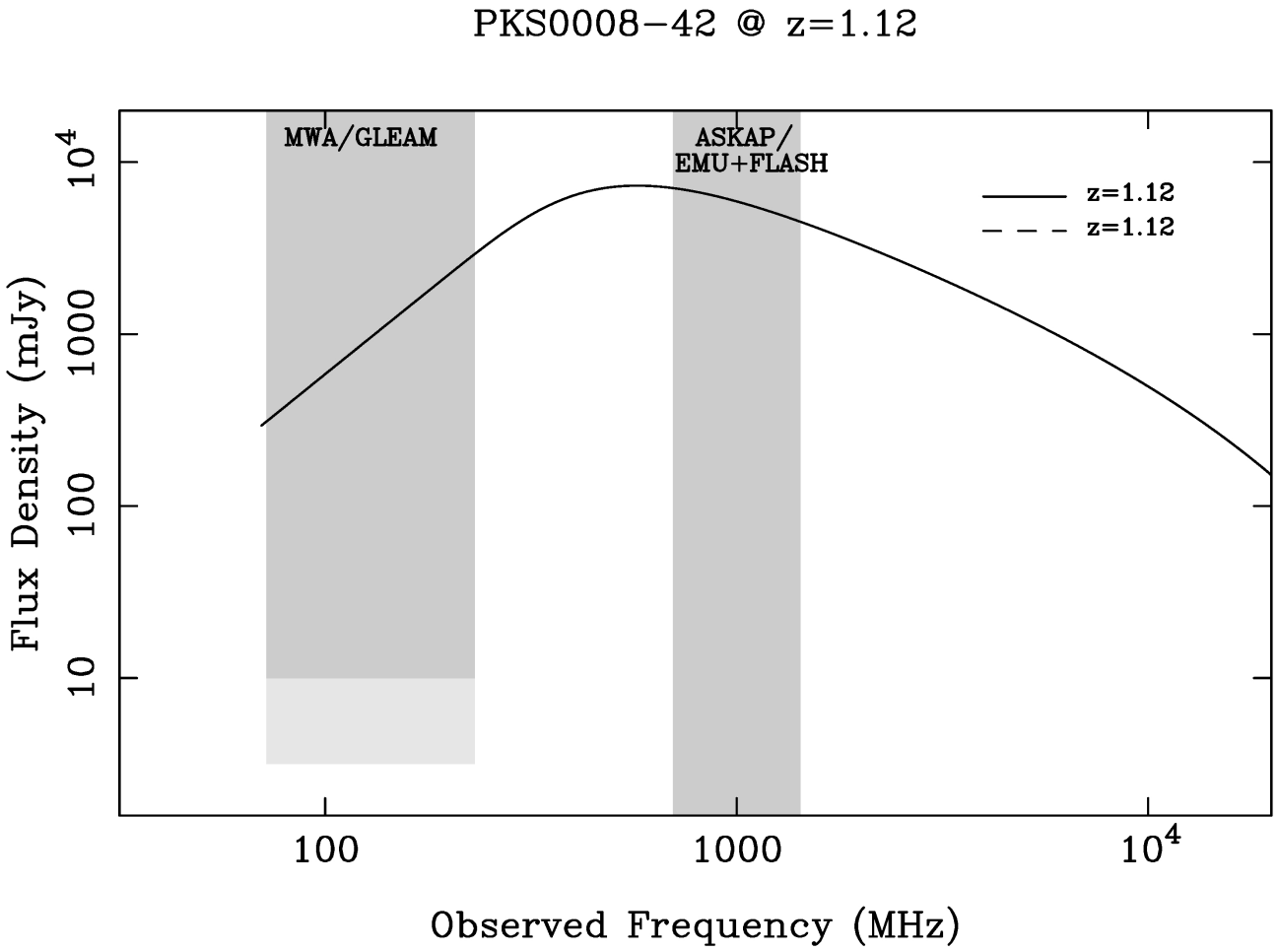
GaLactic and Extragalactic All-Sky MWA Survey

- meridian drift scans ~8 hours of RA.
- 5x2min integration per pointing
- Covering 72-231MHz in 5x30MHz bands
- RMS ~ 2-6mJy/beam but limited by confusion
- Returns ~20 sources deg^{-2} = 0.5M over 2.5π steradian
- Resolution ~2arcmin

GLEAM and ASKAP



The First Black Holes: GPS



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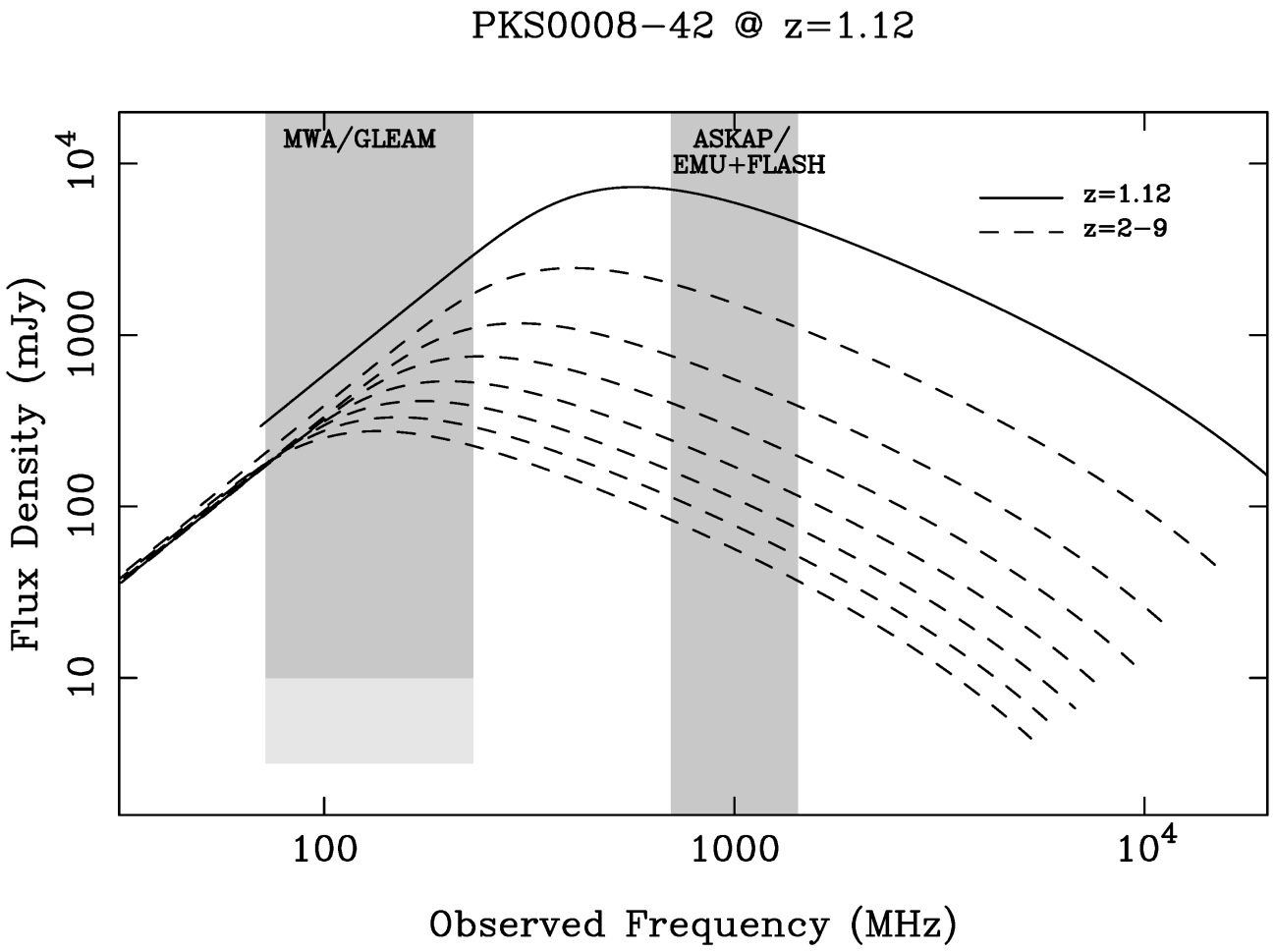
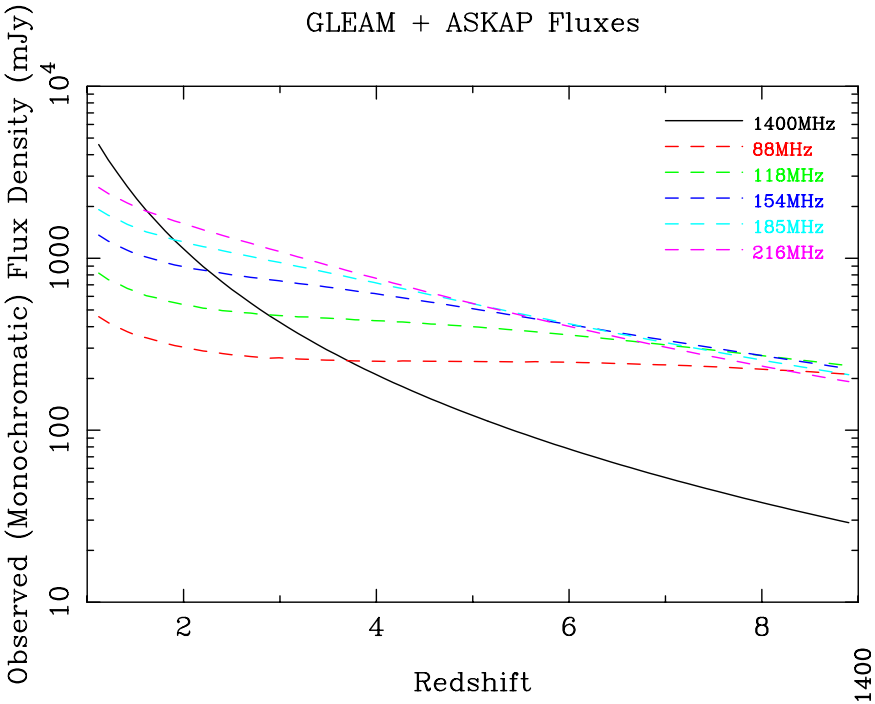
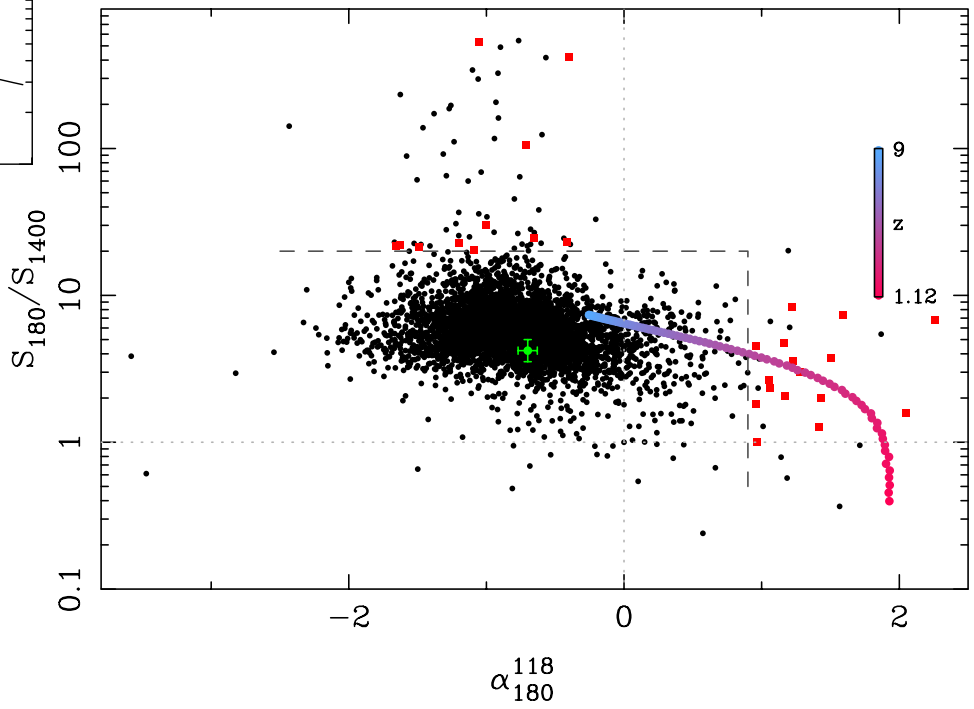


The First Black Holes: in GLEAM

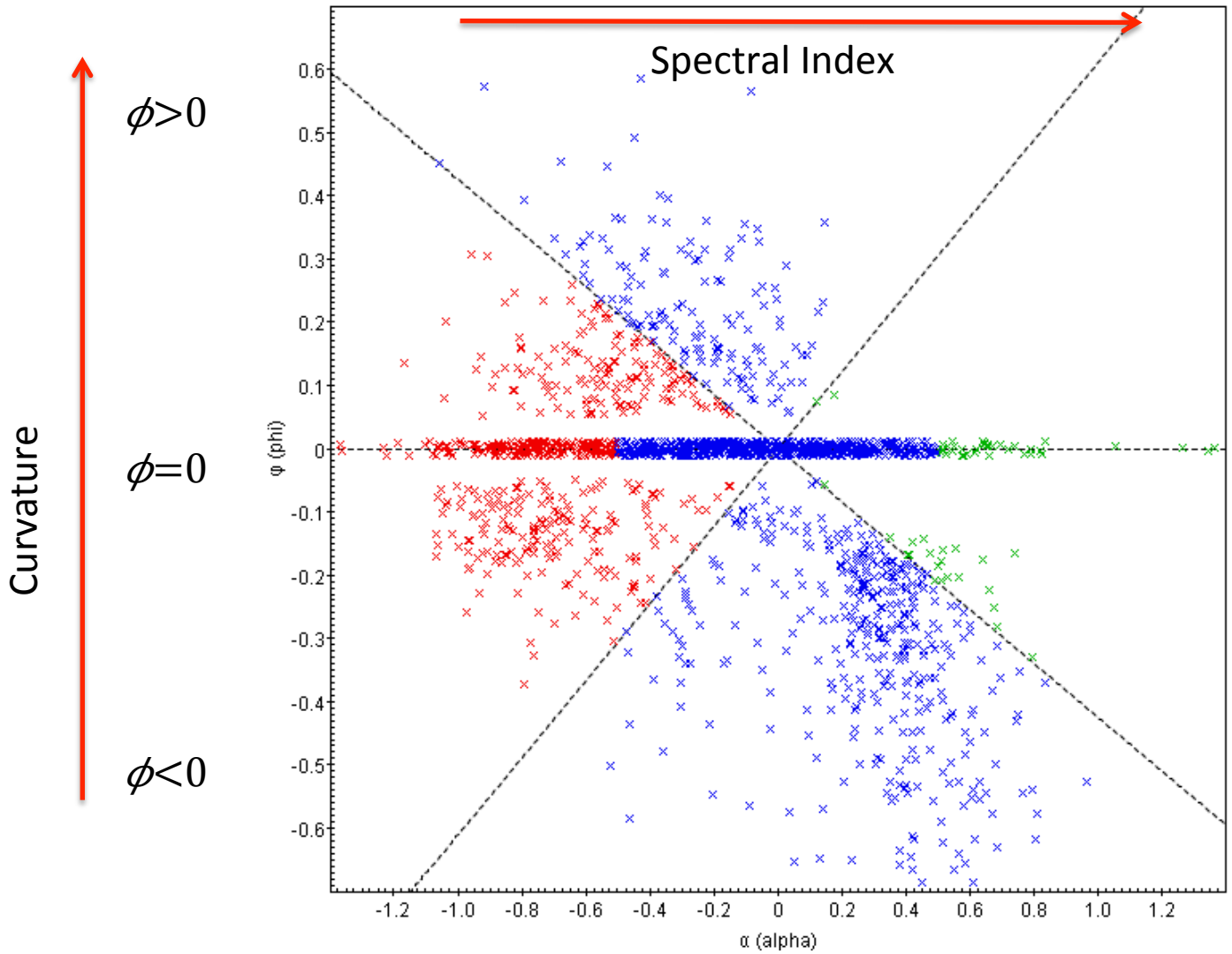


Low-nu flux density ~constant with redshift



Occupy unique part of colour-colour space

Fitting radio SEDs across 0.1-20GHz



Red: $\alpha \lesssim 0$ Blue: $\alpha \approx 0$ Green: $\alpha \gtrsim 0$

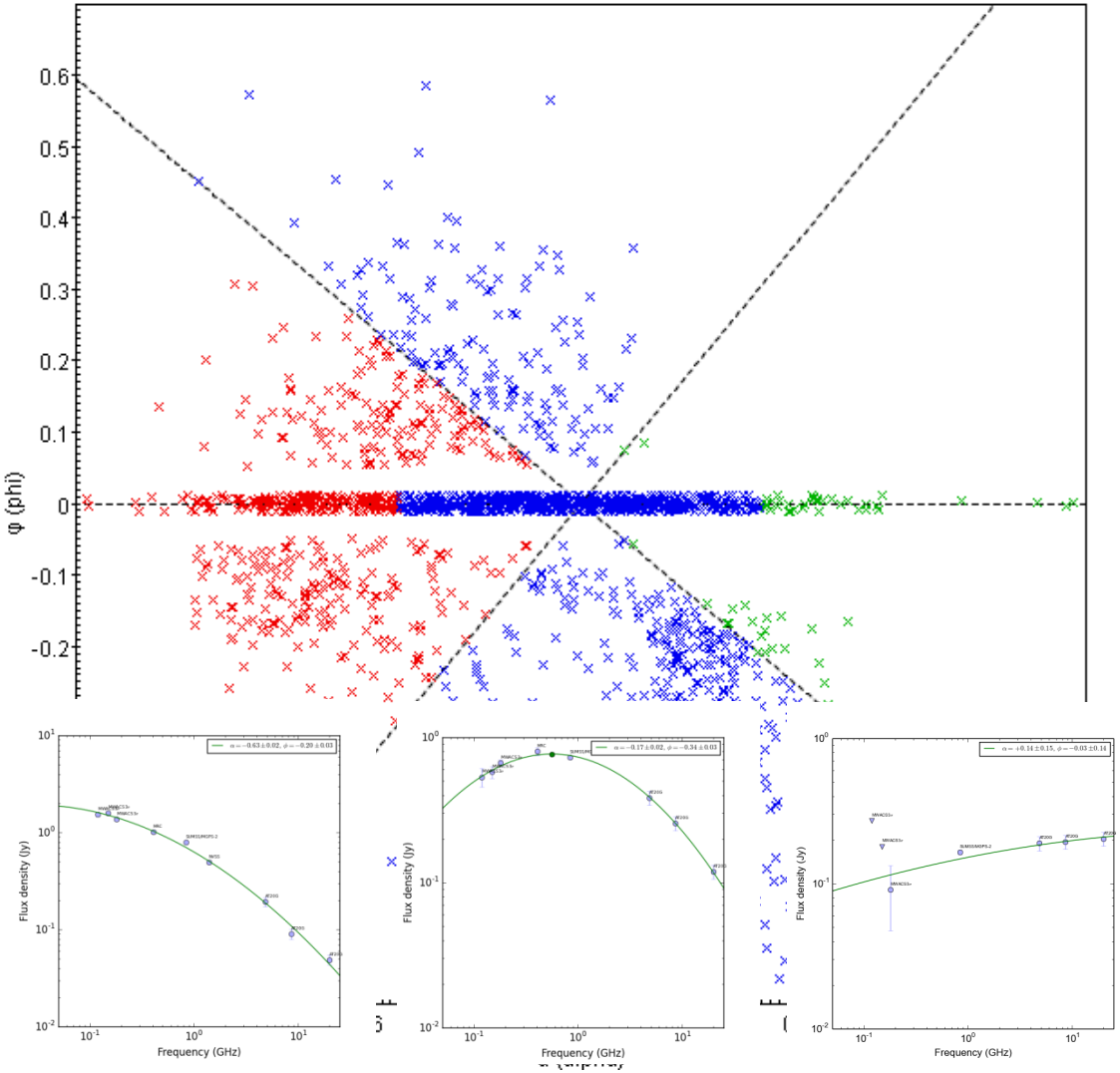
Harvey, [Seymour] et al. in prep.

Fitting radio SEDs across 0.1-20GHz

$\phi>0$

$\phi=0$

$\phi<0$



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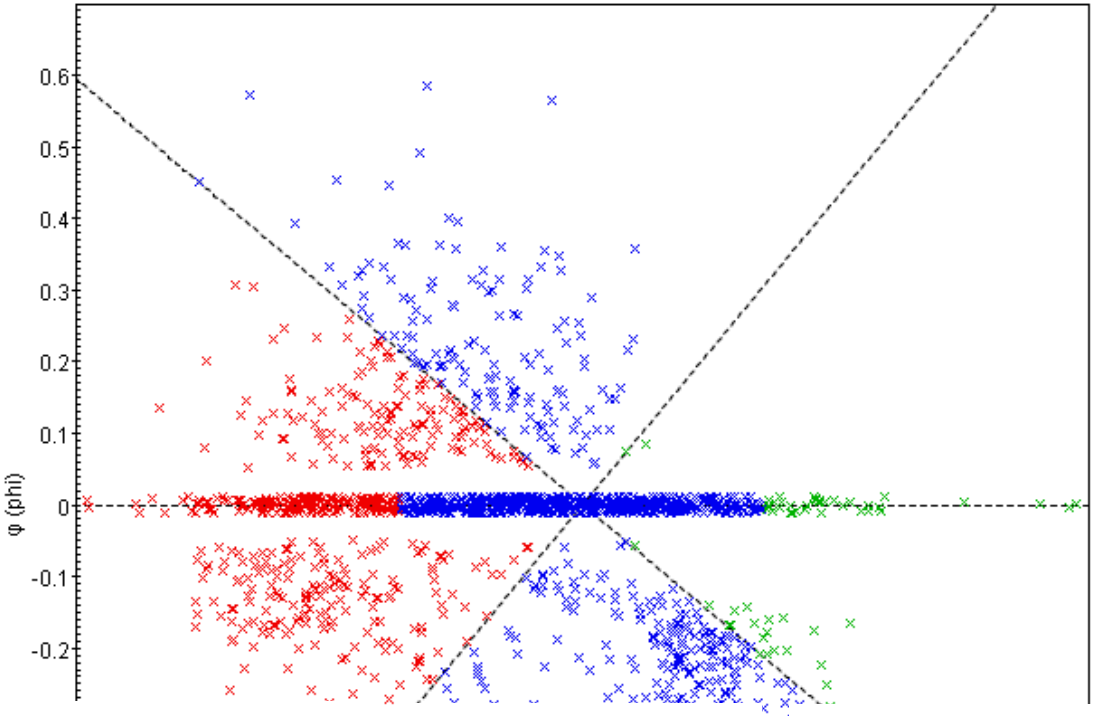

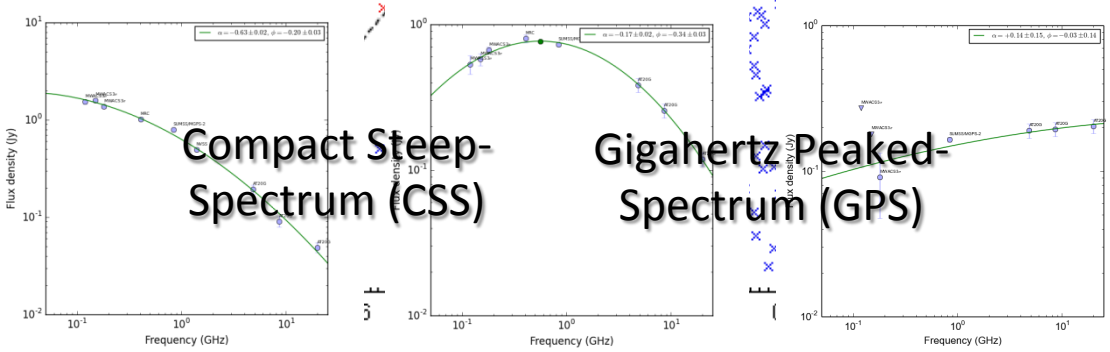

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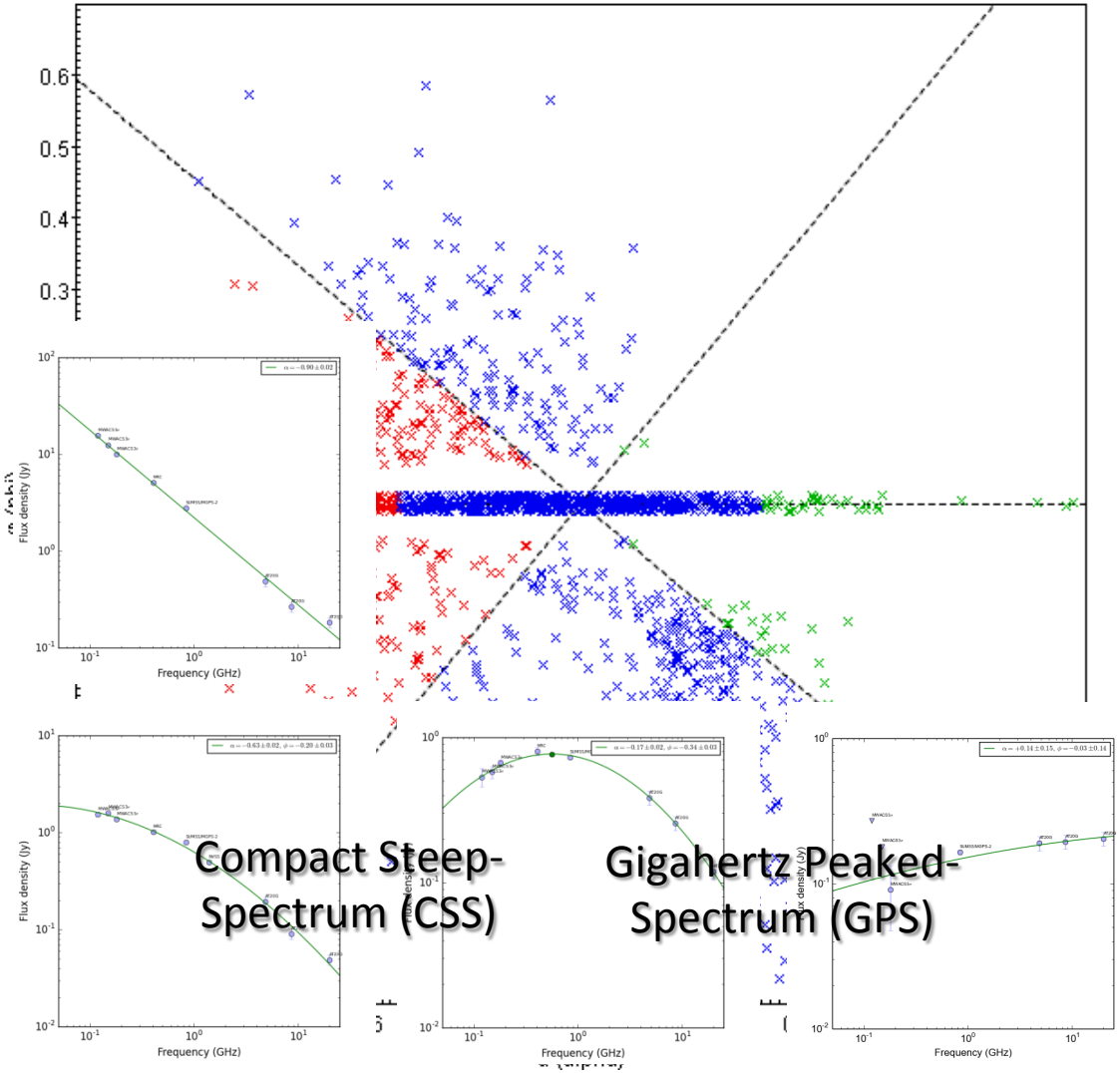

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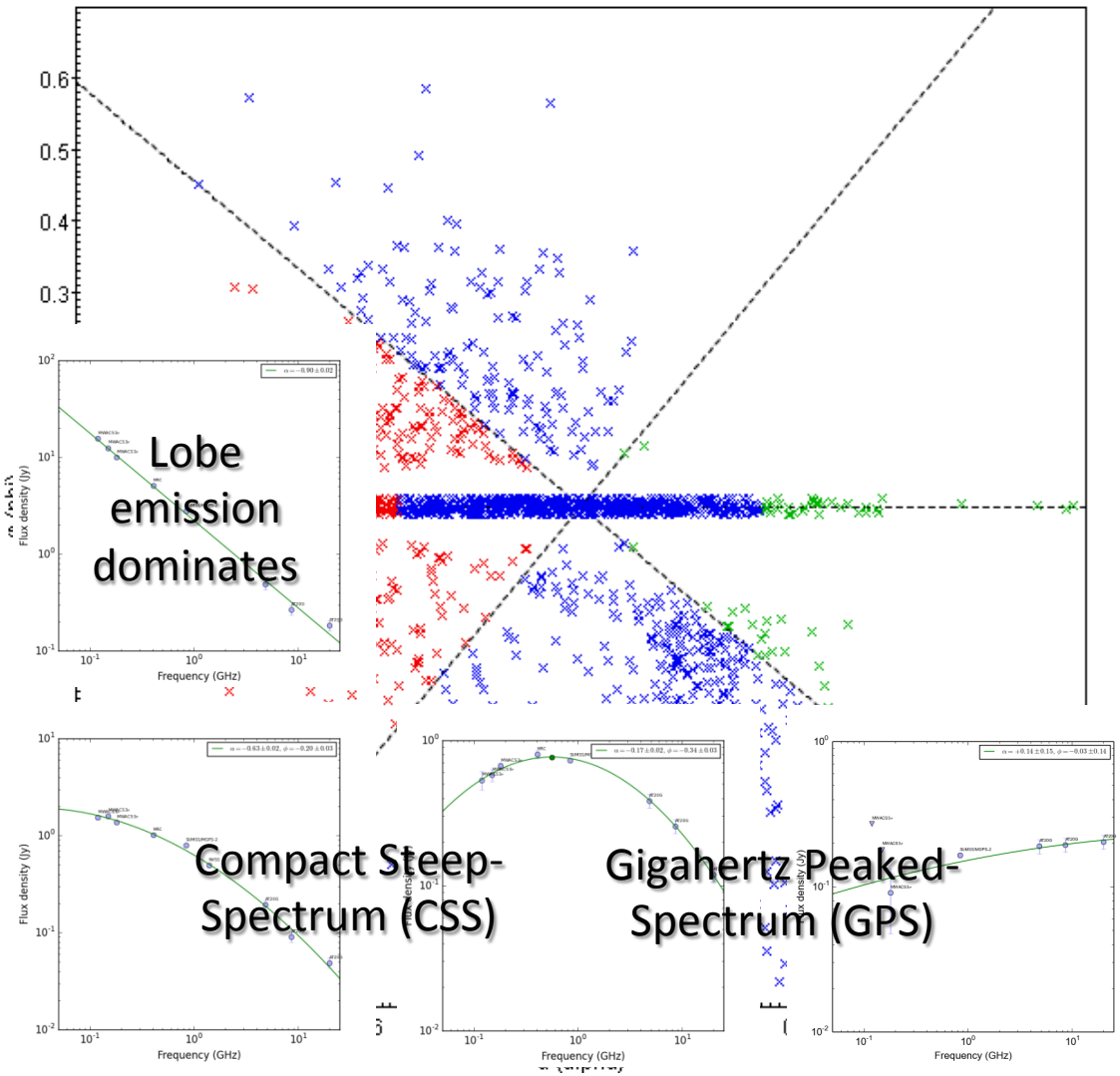

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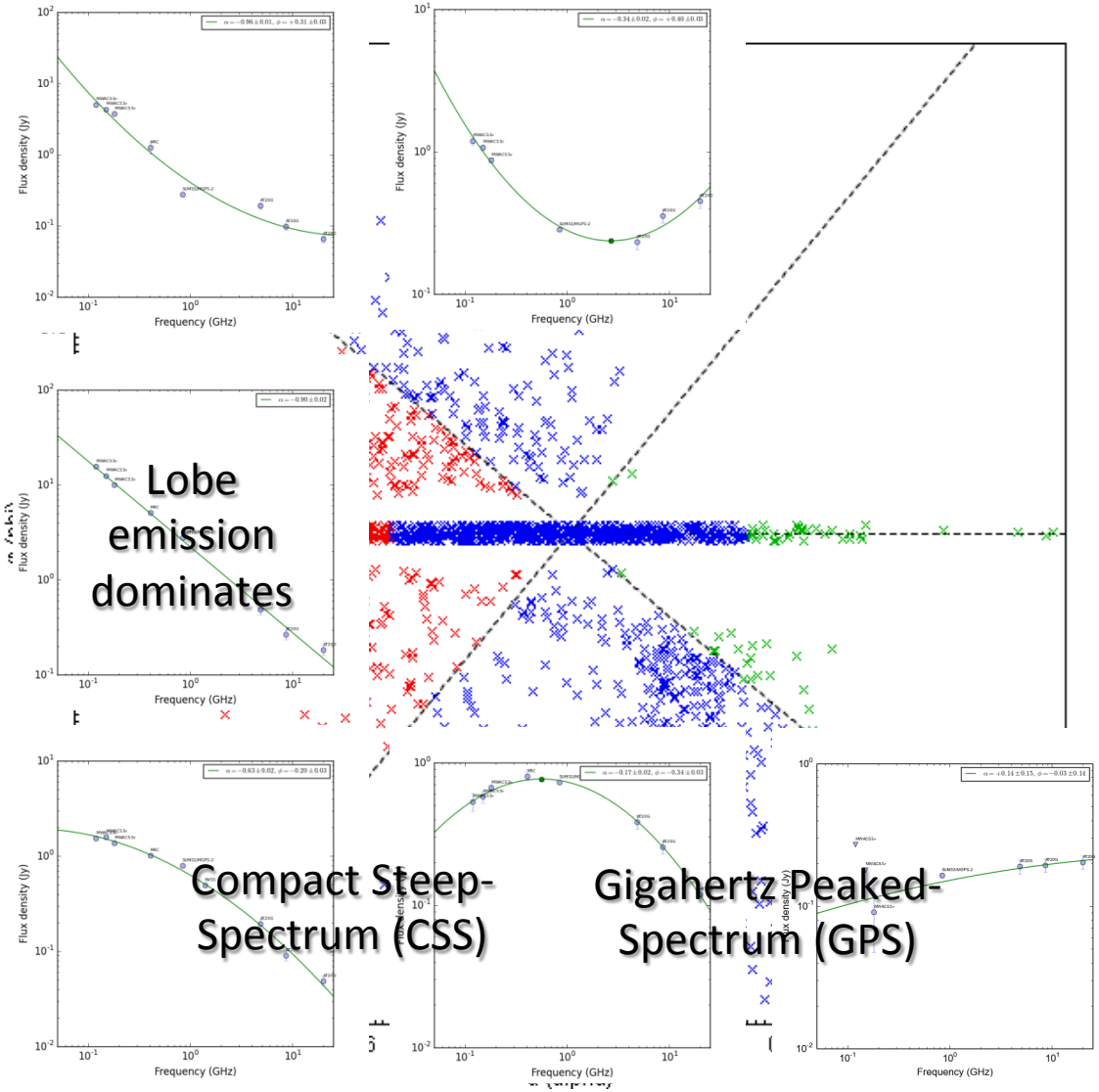

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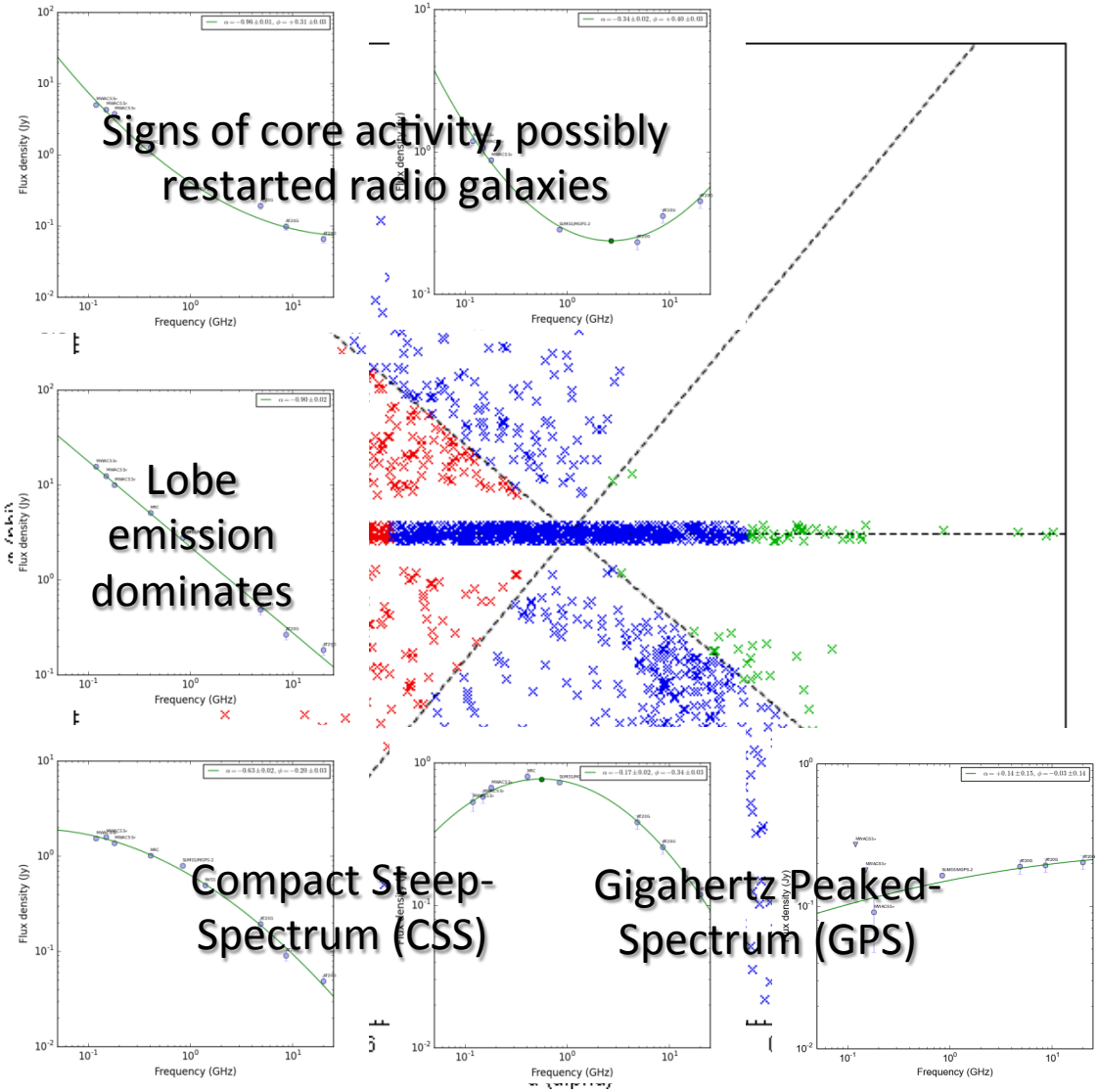

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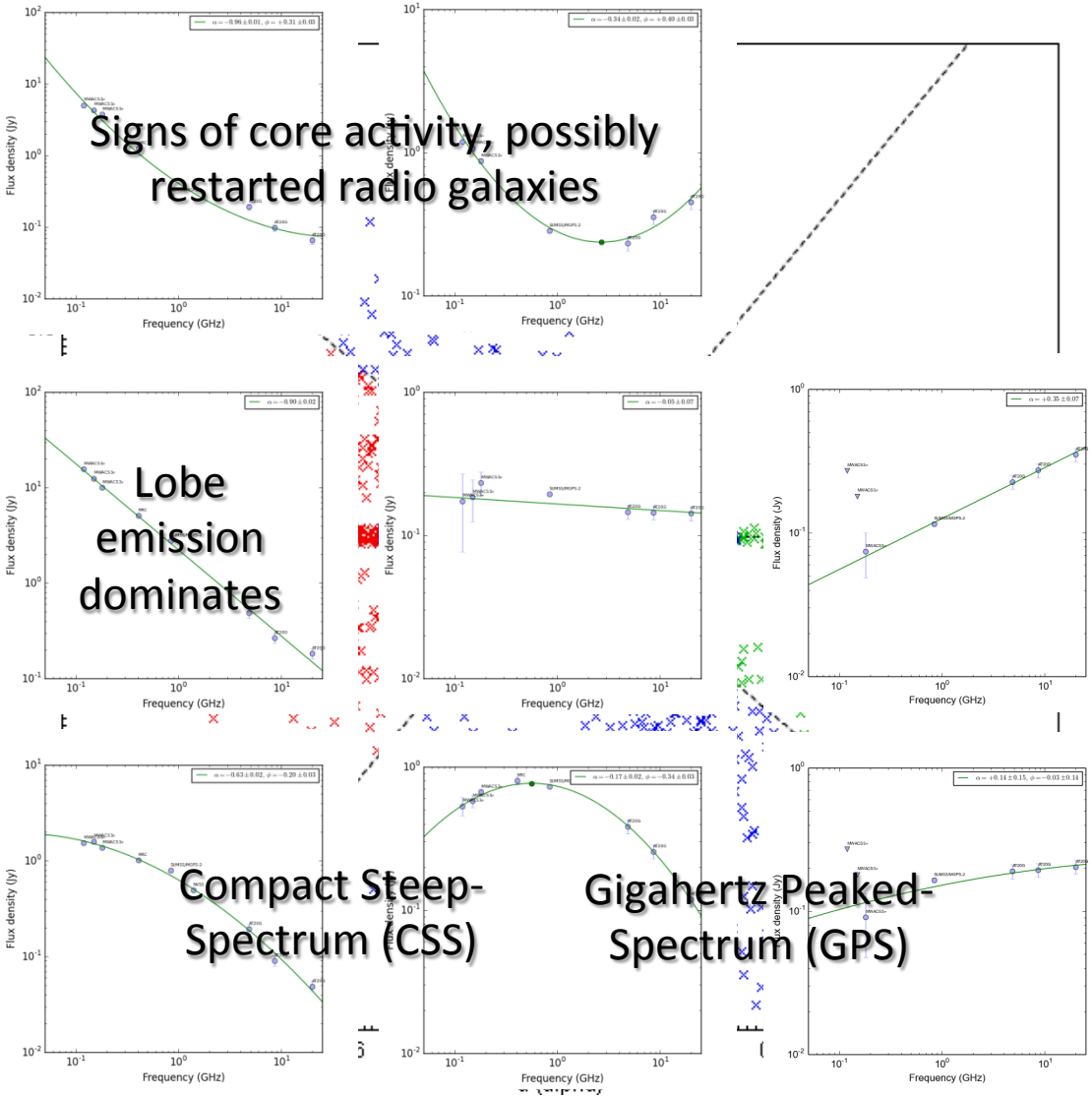

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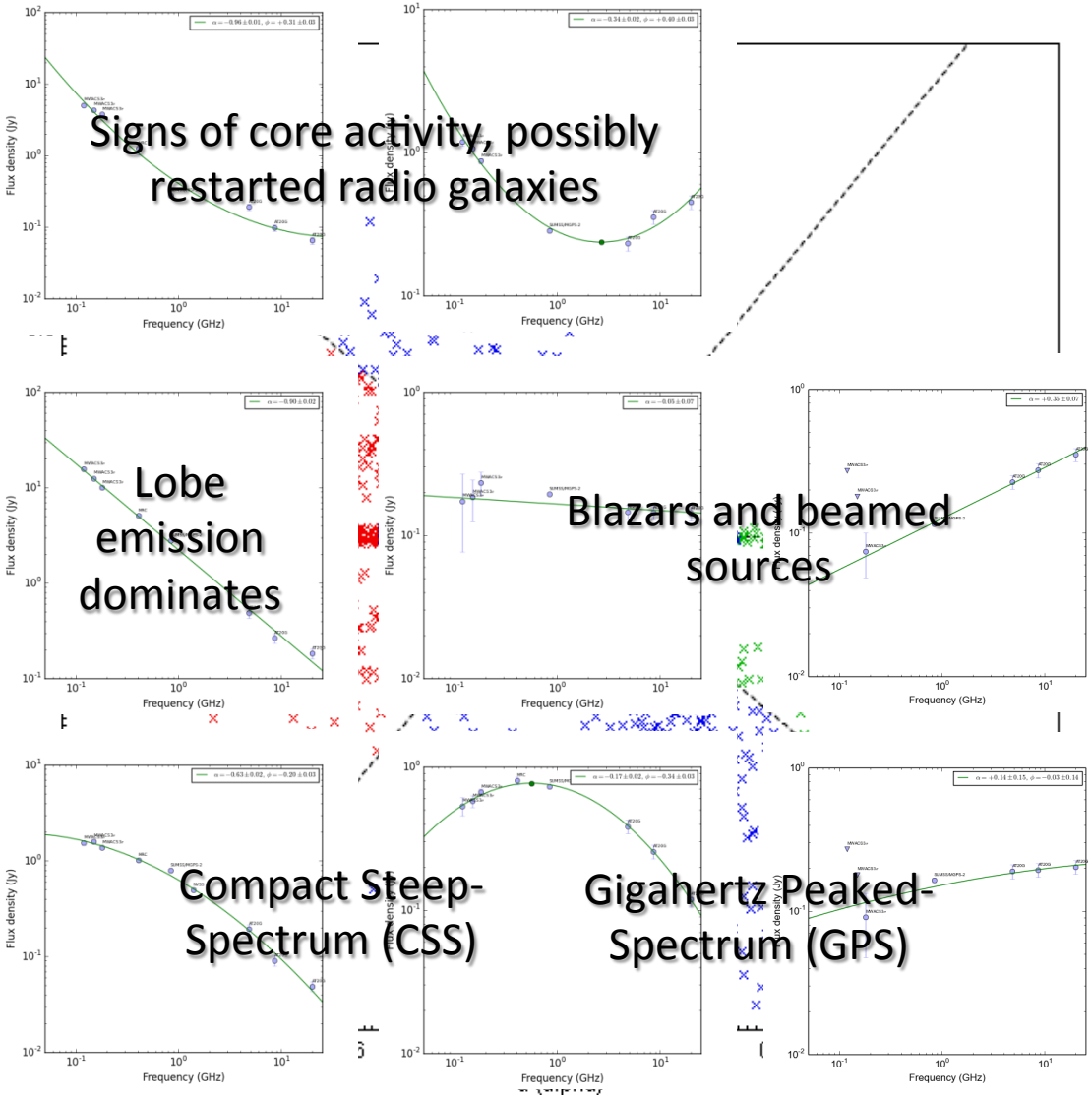

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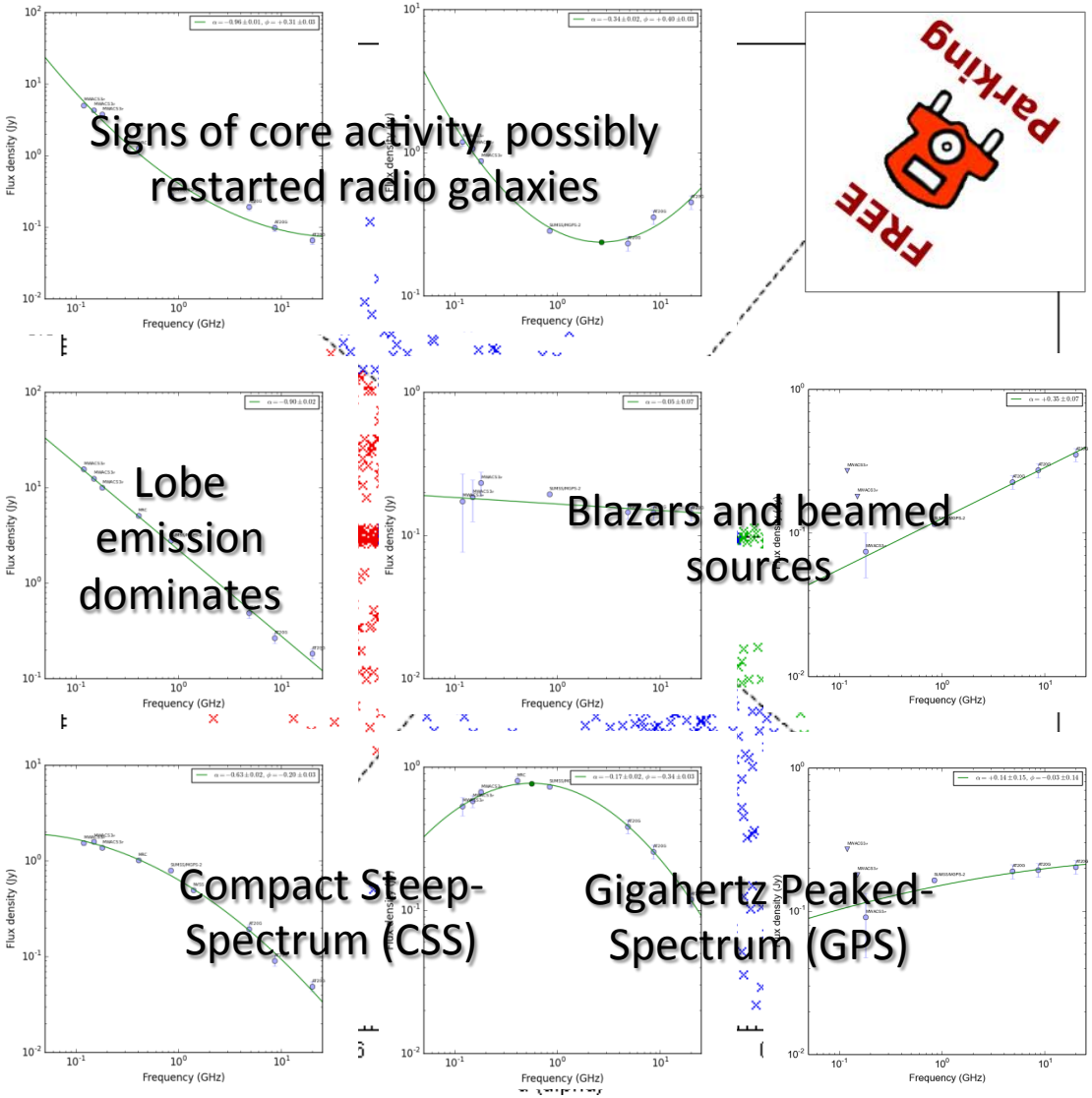

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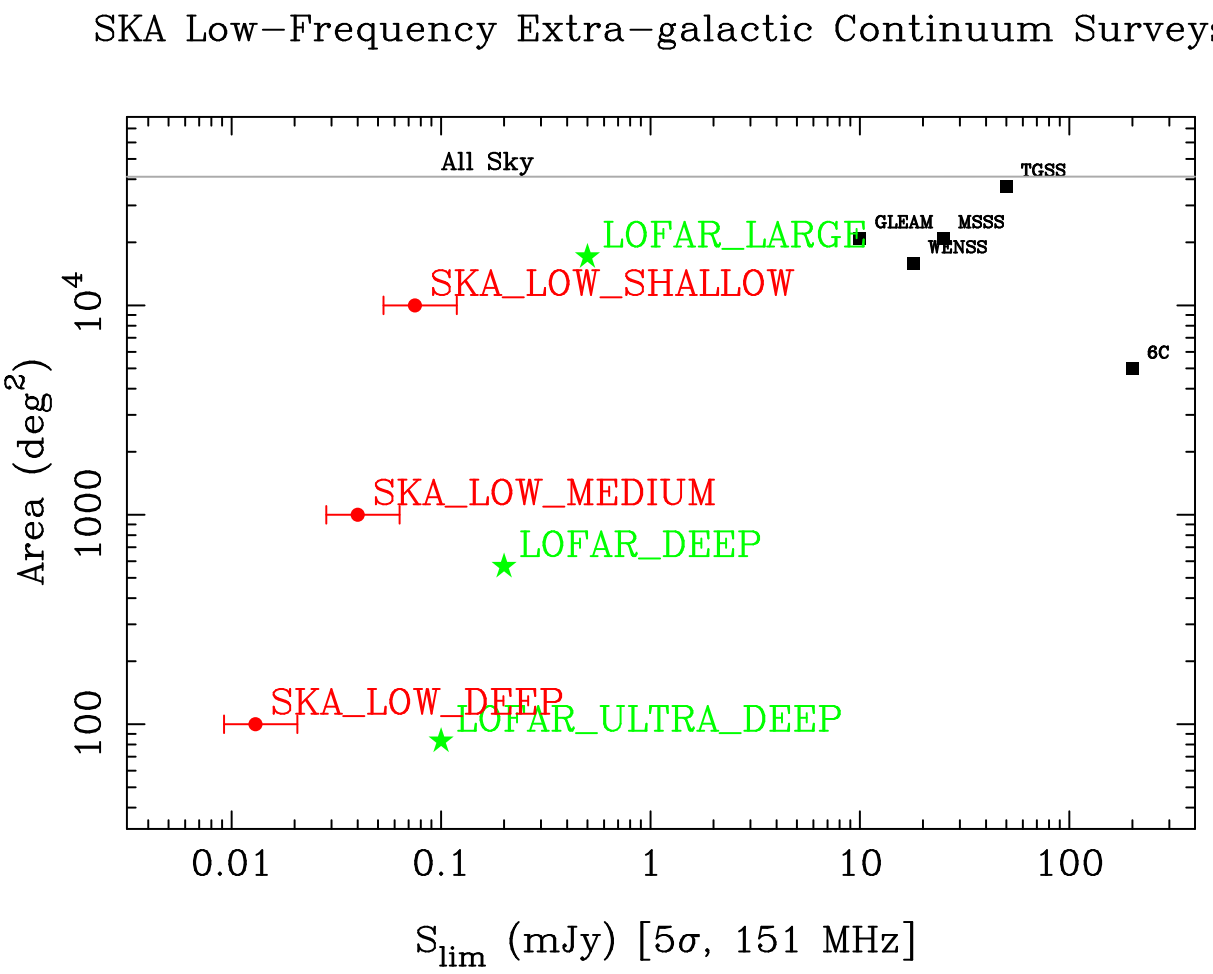
The Future of Low Frequency Surveys



Conclusions

- **MWA and ASKAP provide a unique synergy**
- **New era of broadband radio diagnostics of large samples of radio sources**
- **Allow selection of unique sub-samples**