On the Blazar SEDs

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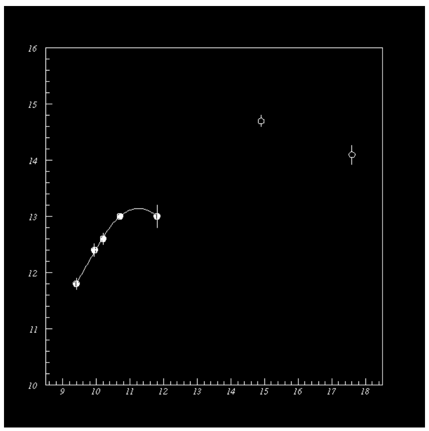
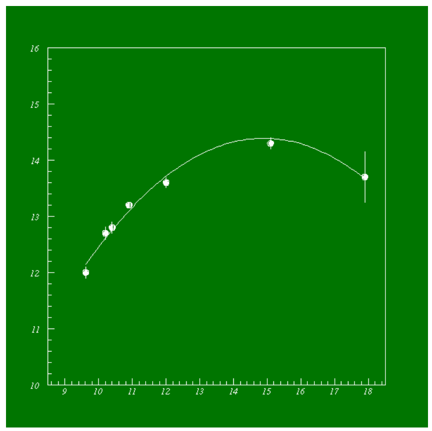
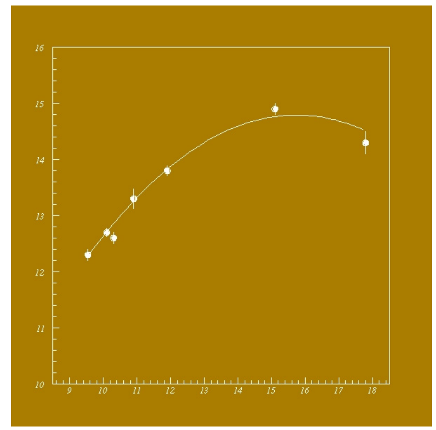
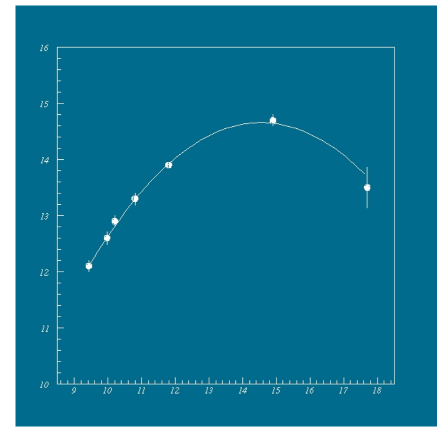





Ian Browne — Jodrell Bank Observatory - Manchester

Alessandro Caccianiga — Osservatorio Brera - Milan

Maria Marchã — Faculty of Sciences - Lisbon

BLAZARS

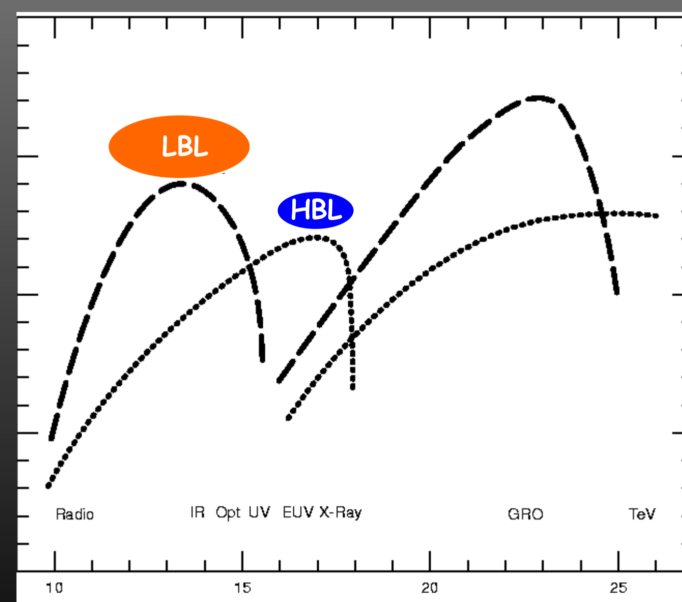
-Blazars are core-dominated, flat radlo spectrum radlo-loud AGNs

-Non-thermal emltters – radlatlon from a relatlvlstlc jet pointing at a small angle to line of sight (Blandford and Rees 1978)

- SED has a 2-hump structure interpreted as synchrotron emlsslon and Inverse Compton scattering of ambient photons by jet relativistic electrons.

- The frequency of the first energy peak shows a remarkable range of 7 magnitudes:

from ~ 10^{11} to 10^{18} Hz

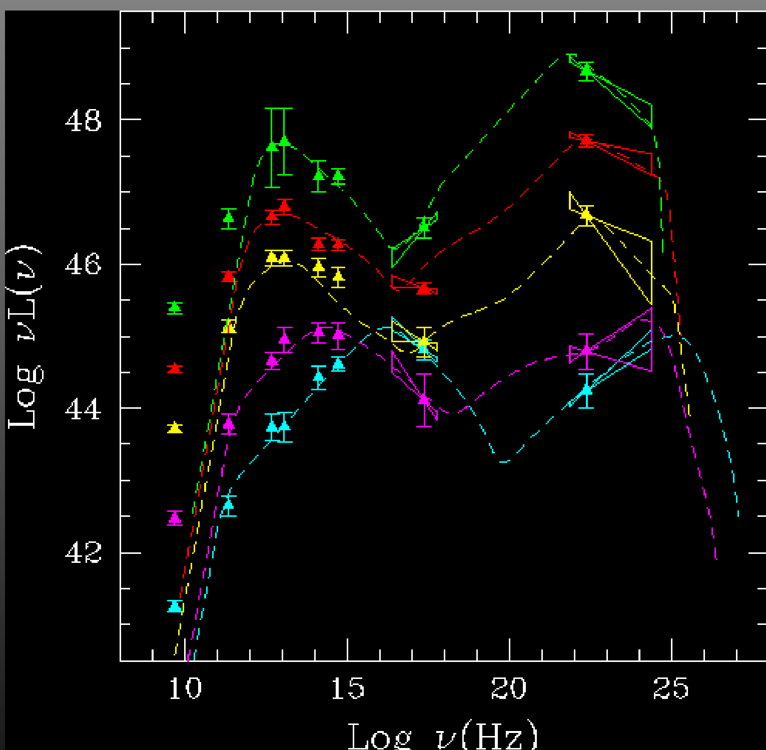


Urry 2001

Spectral Blazar Sequence

Fossati et al 1998 & Ghisellini et al 1998

Observational results suggest an anti-correlation between power and the 1st-peak frequency and theory can explain this in terms of Inverse Compton cooling

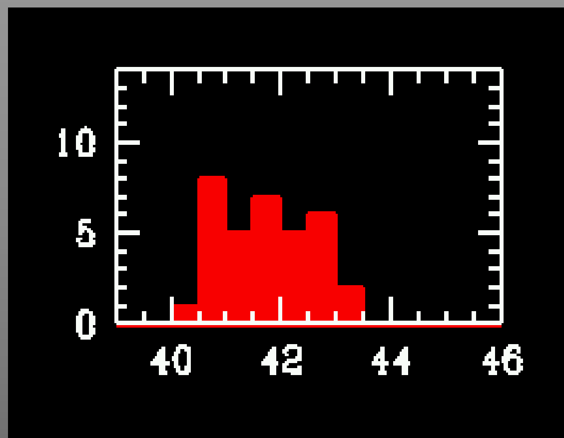


Blazars constitute a spectral sequence
Power is the unique fundamental parameter

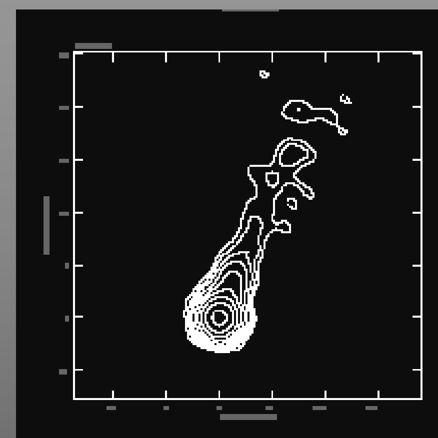
The observations are based on:
1-Jy and 2-Jy samples (radio selected) +
Slew sample (xray selected)

200-mJy sample

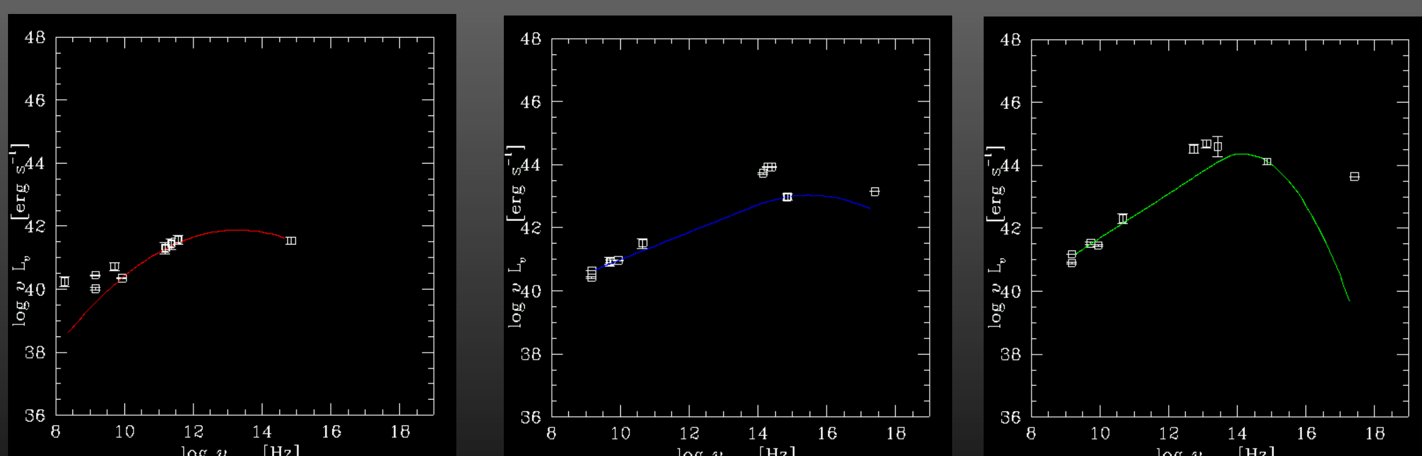
radio-selected + Low radio-luminosity objects



log (ν L_ν) @ 5GHz [erg s^{-1}]

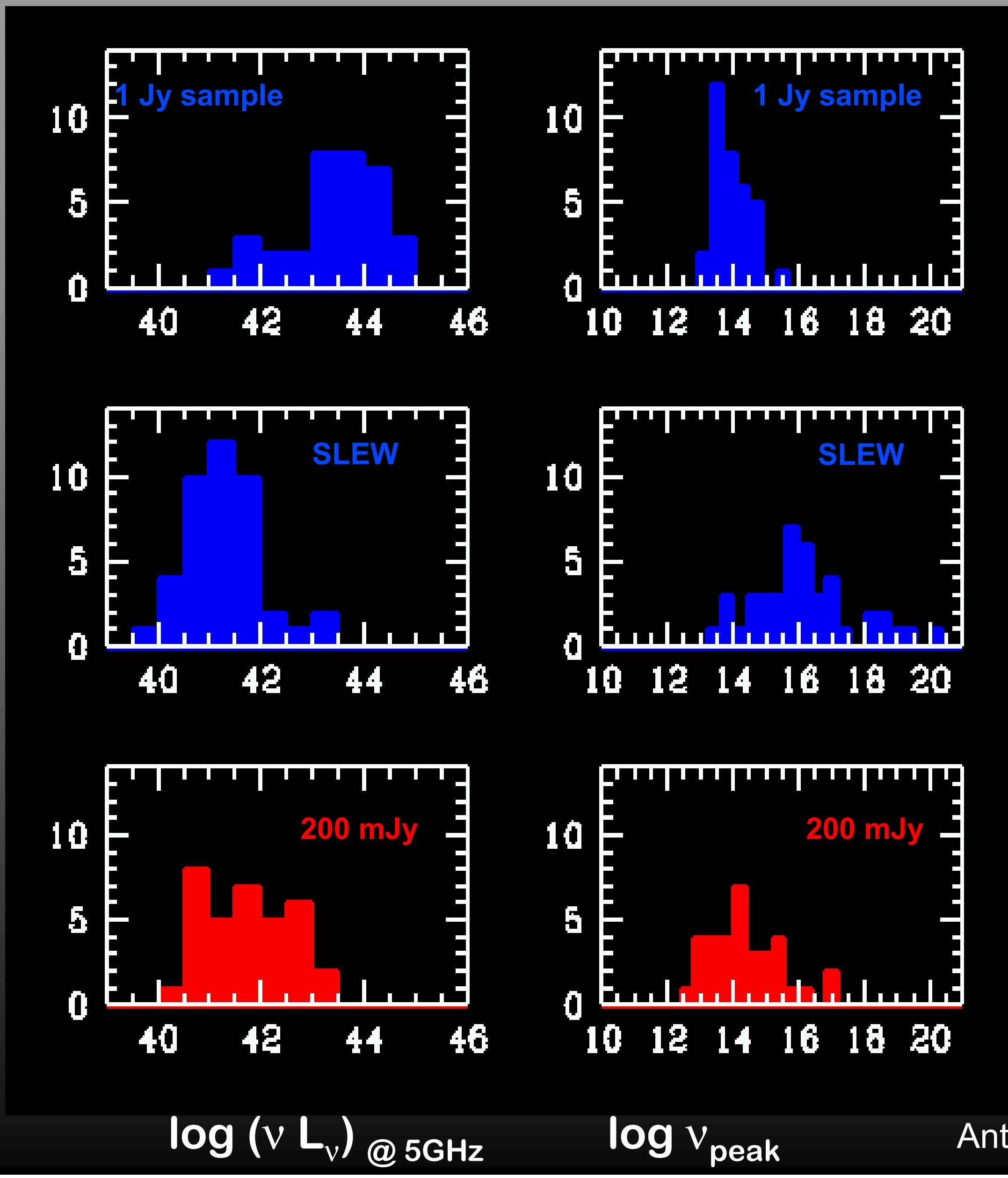


Bondi et al 2004



Anton et al 2004

PEAK FREQUENCY & LUMINOSITY DISTRIBUTIONS
1 Jy, Slew, 200 mJy



Radio luminosity of the 200 mJy sample similar to Slew but ...

Peak frequency distribution similar to the 1 Jy sample (95% conf. level)

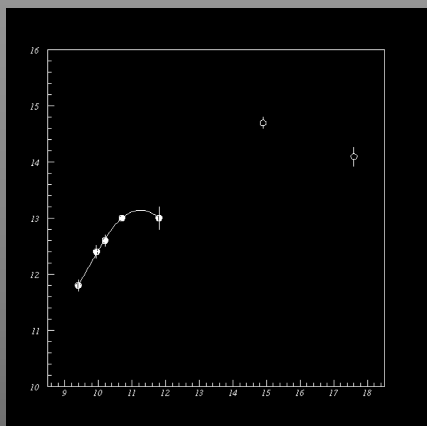
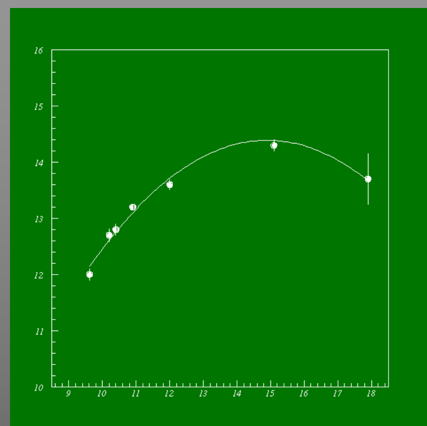
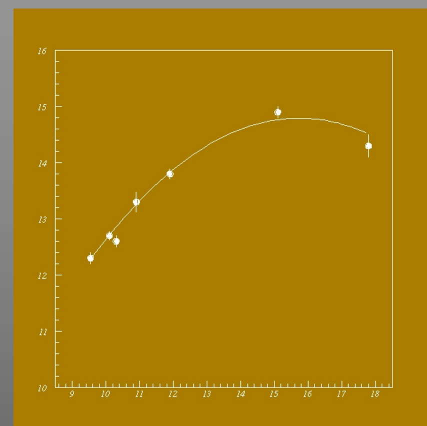
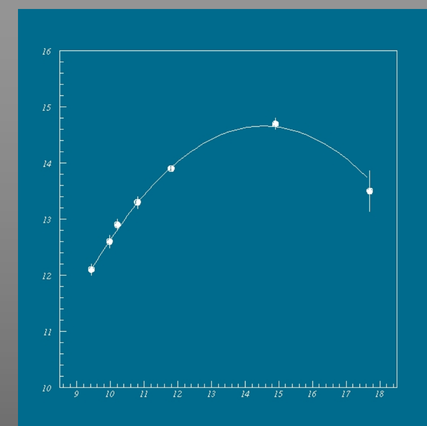
Is the method of selection more influent on the peak distribution than it is the intrinsic power ?

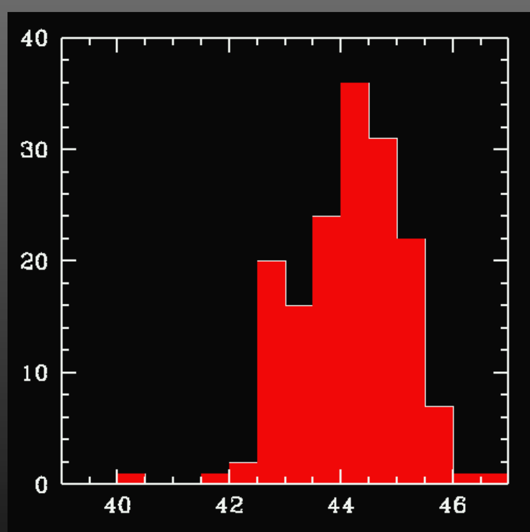
Antón & Browne 2005

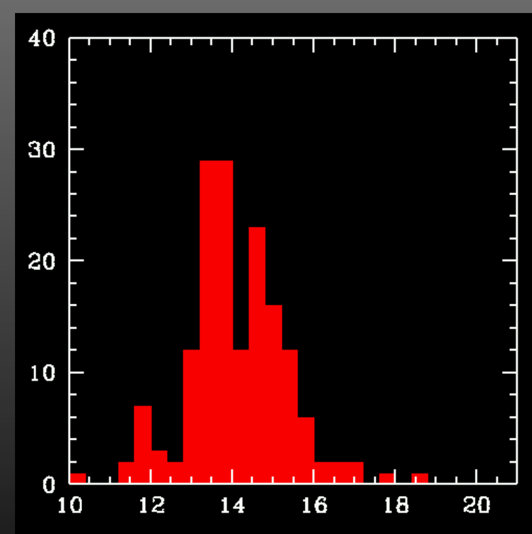
SEDs of Superluminal Objects

Caltech-Jodrell Bank flat spectrum sample (CJF)

Taylor et al 1996



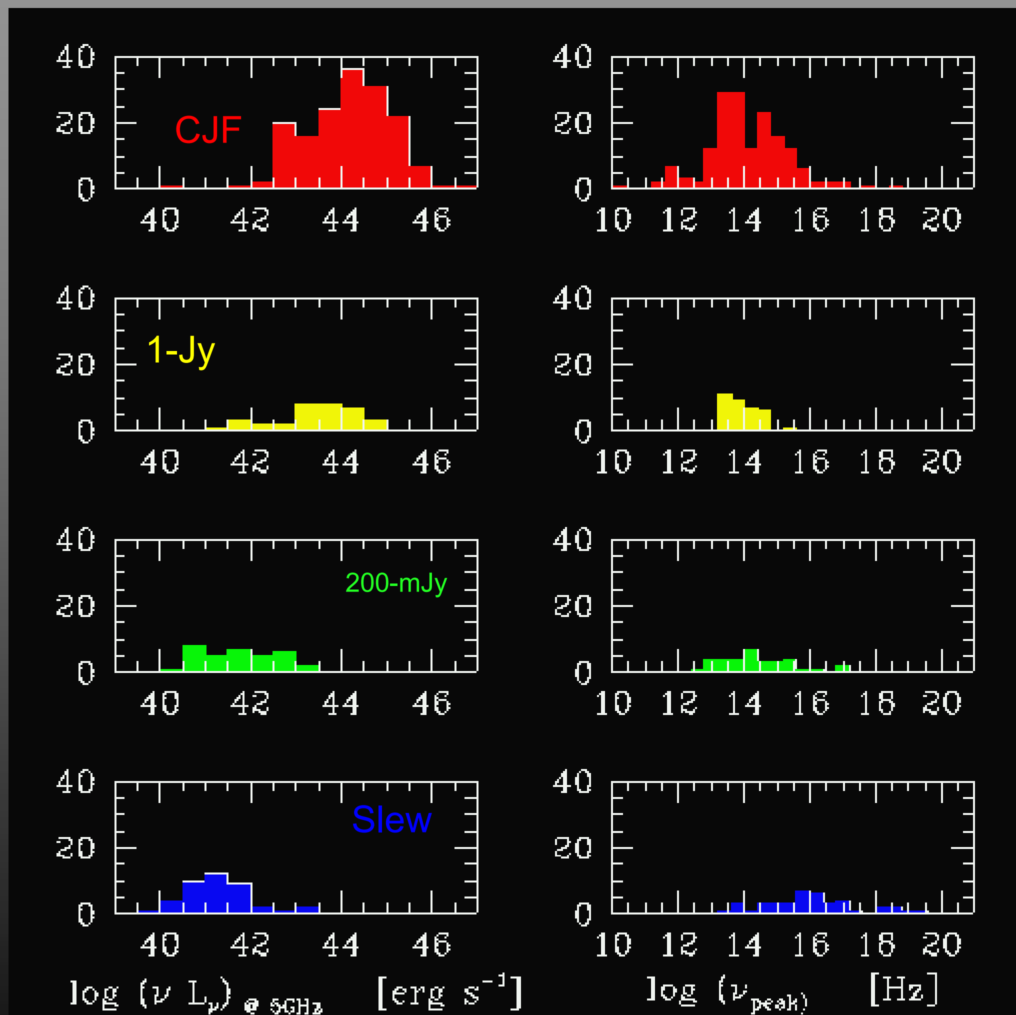


Anton et al in prep

Spectral Blazar Sequence

TESTING IT

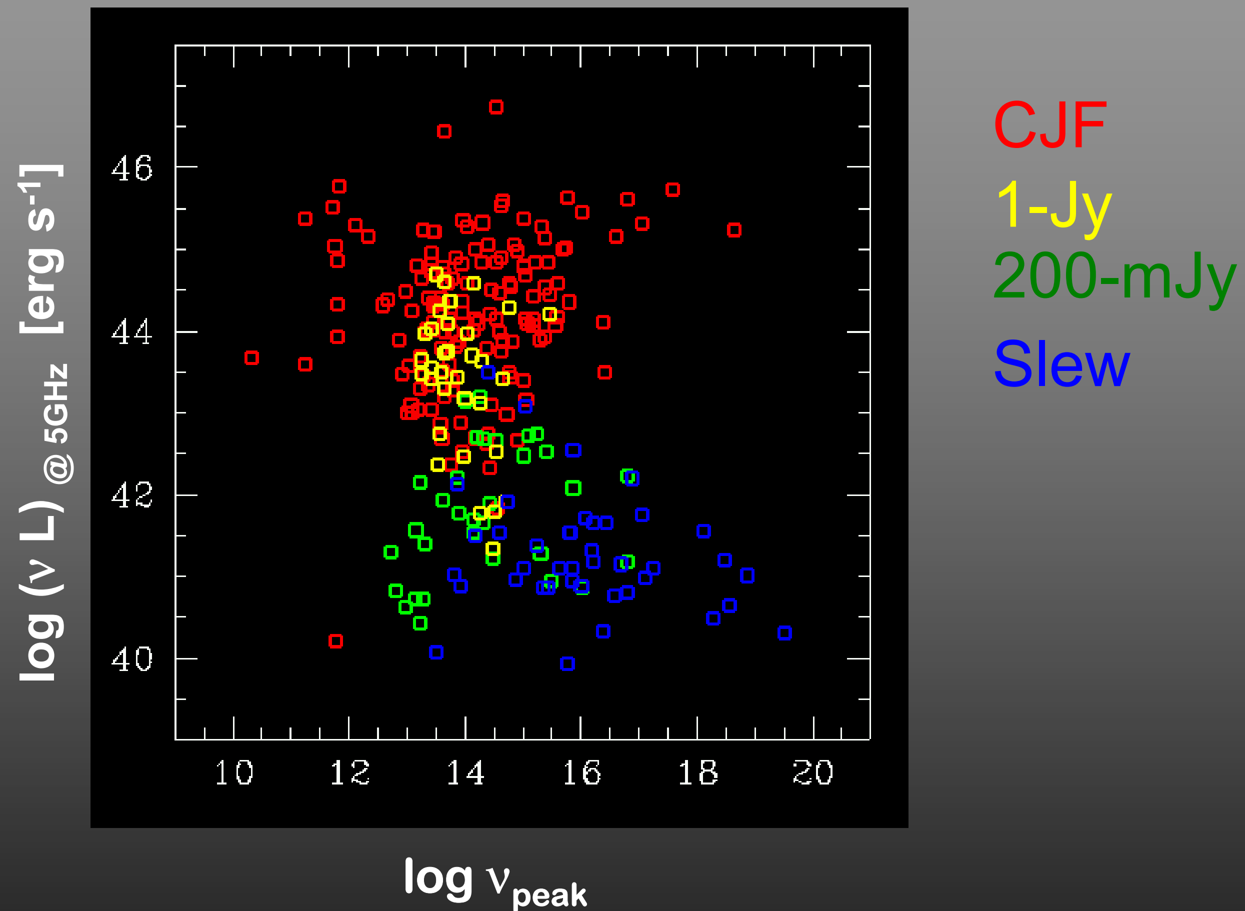
Range of radio power
~ 4 magnitudes



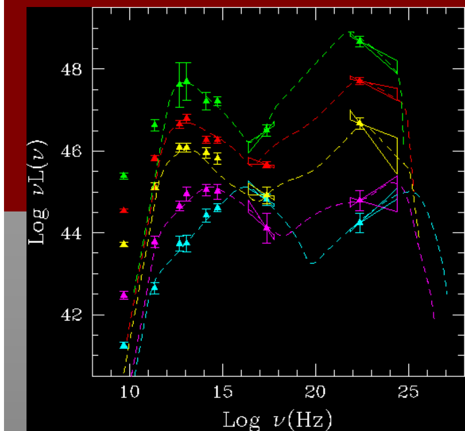
$\log \overline{\nu}_{peak} \sim 14$

Spectral Blazar Sequence

TESTING IT



No correlation between power and frequency peak is found when the radio-selected samples are considered, but only when the X-ray selected sample is also present (at 99.9% significance level).



Spectral Blazar Sequence

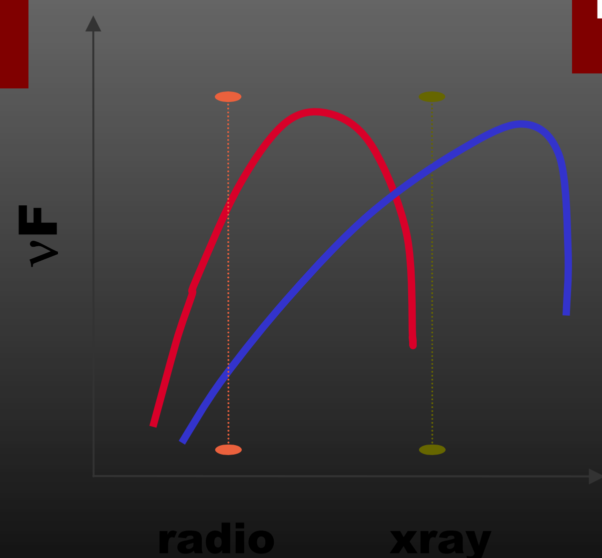
Selection Effects?

(I) amongst low luminosity blazars only those that have high peak frequencies are easily recognised as blazars

(II) the peak frequency distribution is correlated with the initial sample selection frequency:

Low frequency band of selection biases the samples to objects that are stronger at low frequencies
->
Radio selected samples detect preferentially the low frequency peaked objs

High frequency band biases the samples to objects that are strong at high frequencies
->
X-ray selected samples detect preferentially the high frequency peaked objs



In SBS, the radio-selected objects have the highest radio luminosities

In SBS, the xray-selected objects have the lowest radio luminosities

SUMMARY

- Low frequency peaked low radio power objects have been identified
- High frequency peaked broad emission line objects identified

No evidence for an anti-correlation between luminosity and peak frequency
(Anton& Browne, also Caccianiga&Marcha, Nieppola et al, Padovani et al)

Selection effects can explain at least part of the correlation:

amongst low luminosity blazars only those that have high peak frequencies are easily recognised as blazars

+

the peak frequency distribution is correlated with the initial sample selection frequency.