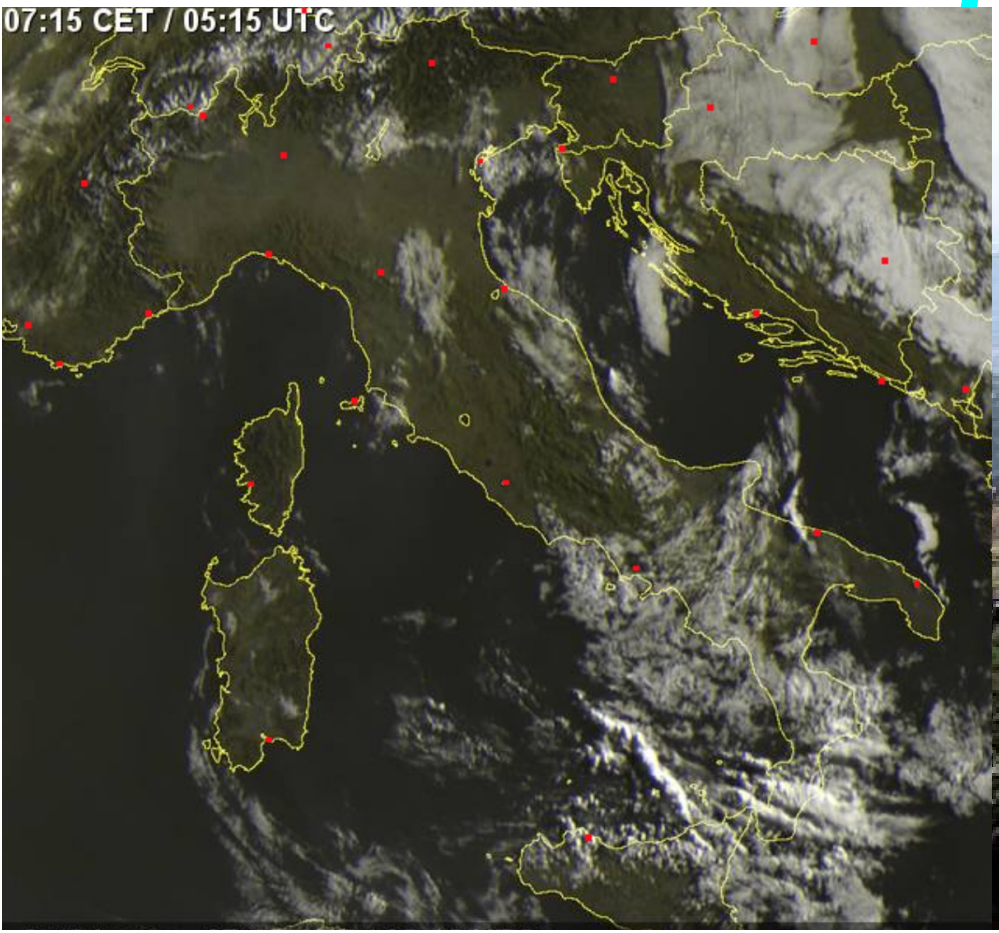
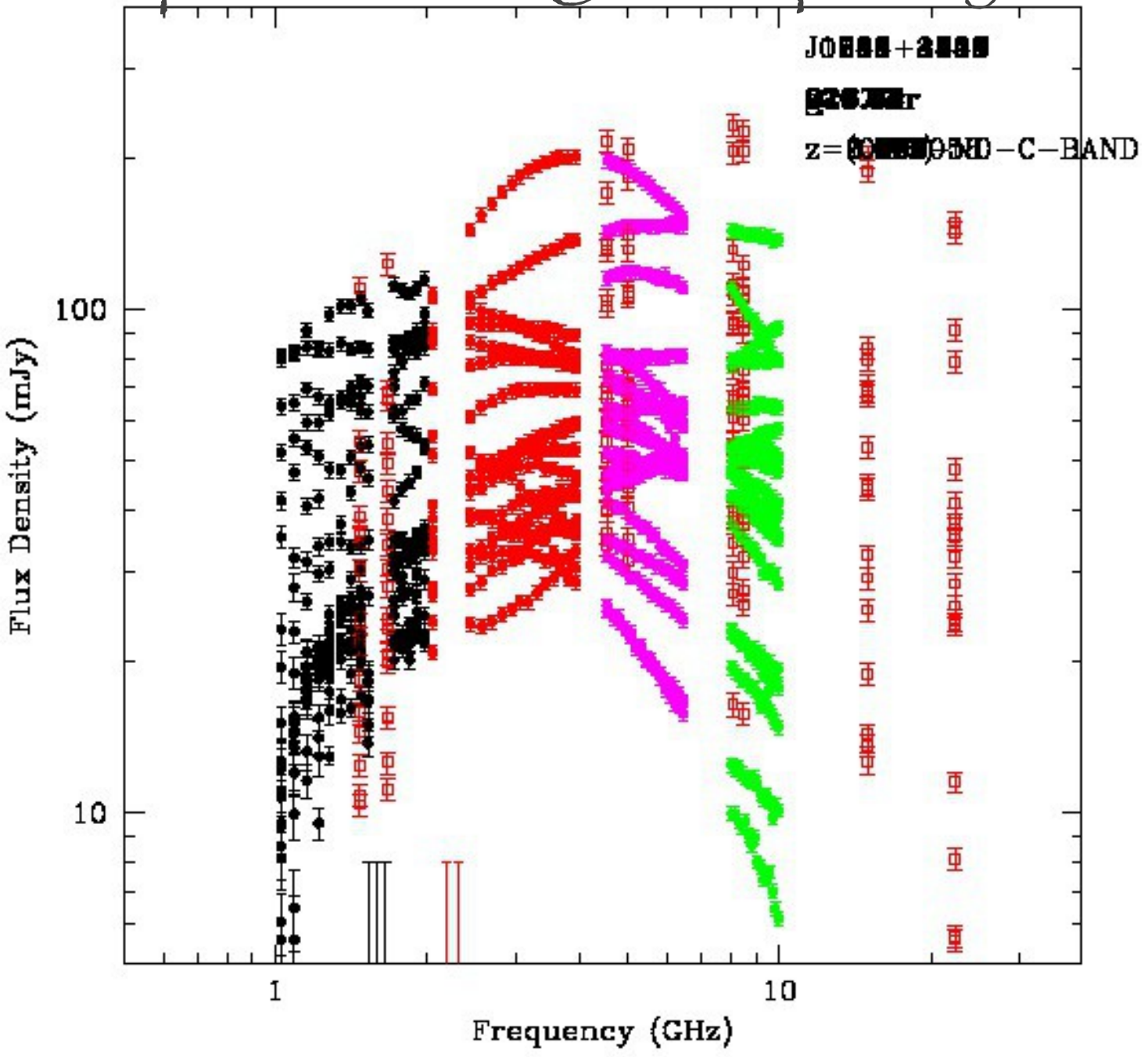
Daniele Dallacasa & Monica Orienti

Radio spectra of High Frequency Peakers

Fifth CSS-GPS workshop, Rimini, May 27-29, 2015



Radio spectra of High Frequency Peakers



High Frequency Peakers

Or extreme GPS.....

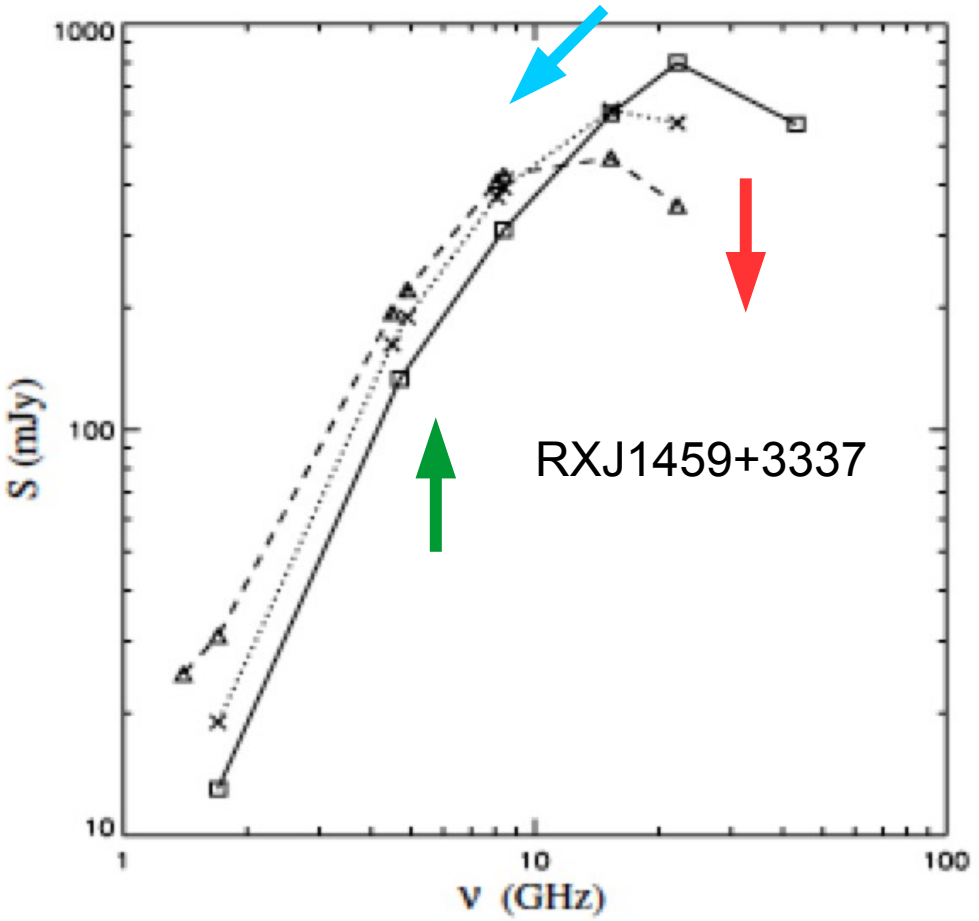
definition based on their radio spectrum

Ideally very young sources, but should/could be

- *very* rare
- *very* small
- "unsettled"
  -> variable ?

Prototype: RXJ1459+3337

(Edge + 1996; Orienti & Dallacasa 2008)



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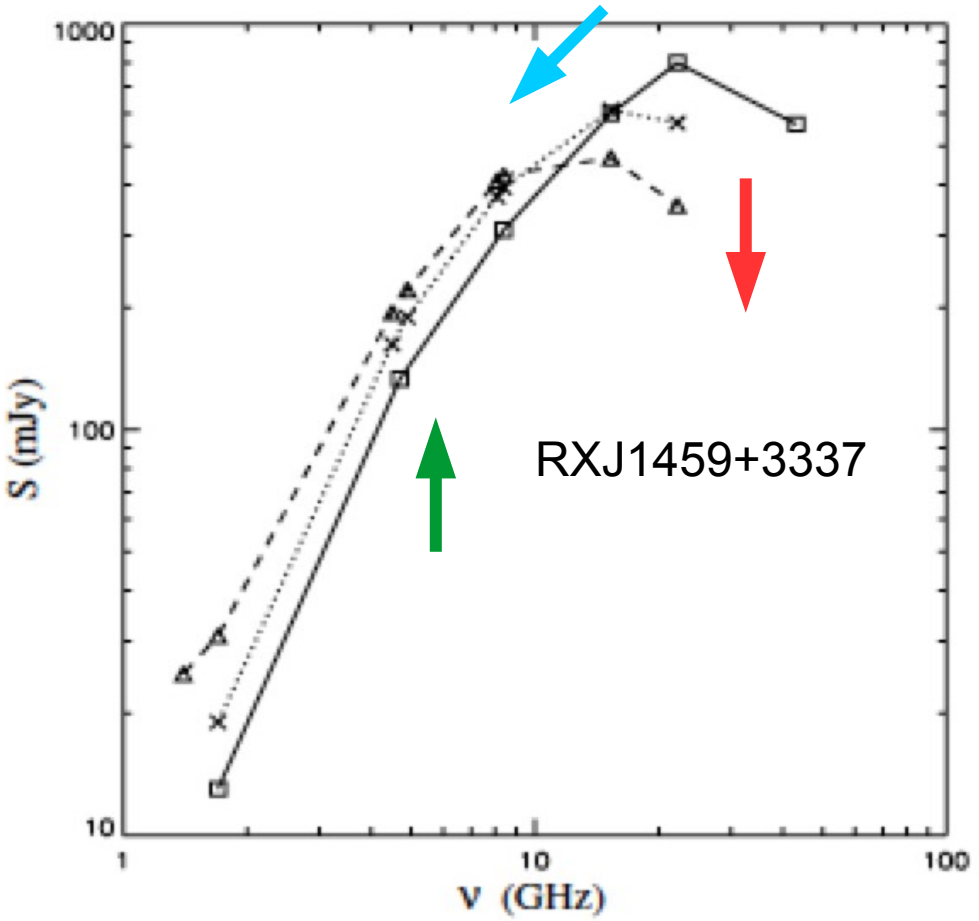


High Frequency Peakers

Samples: Bright (Dallacasa & Stanghellini 2000; Guerra+ 2002)
Weak (Stanghellini, Dallacasa, Orienti 2009)
AT20G (Hancock + 2010)

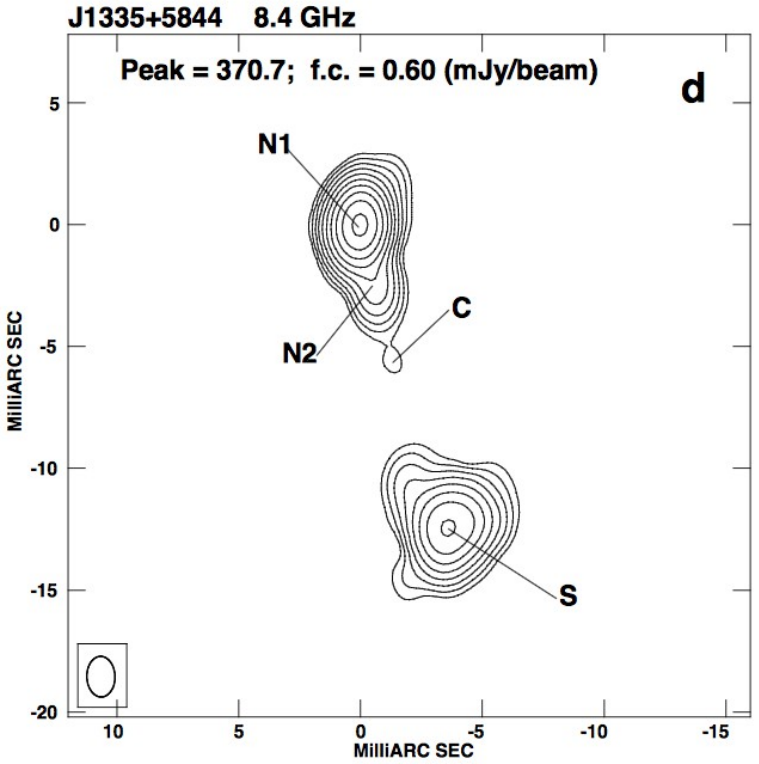
- selection based on the (non-simultaneous) spectrum + point-like on the arcsecond scale

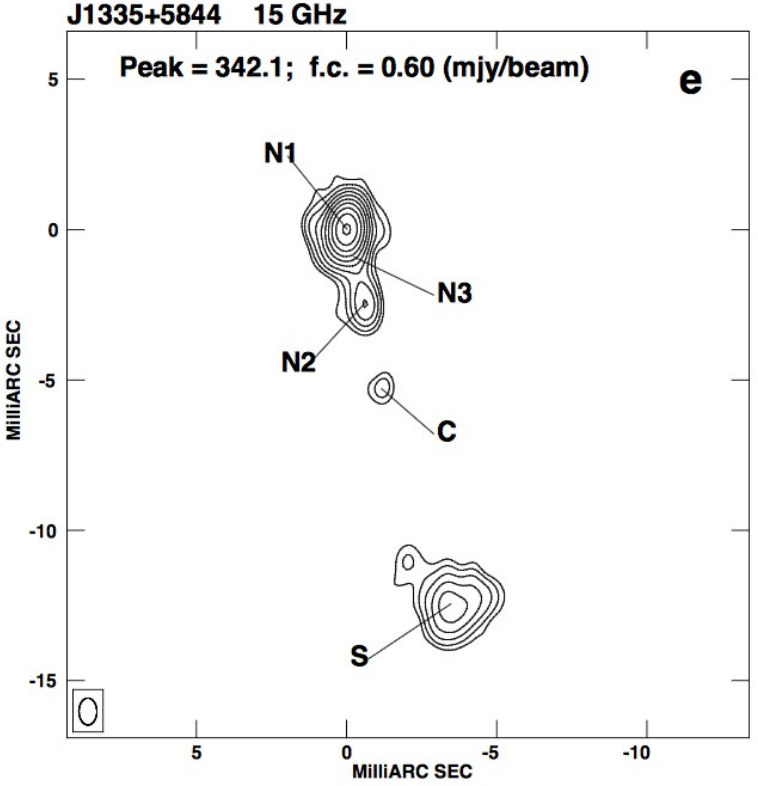
Properties:

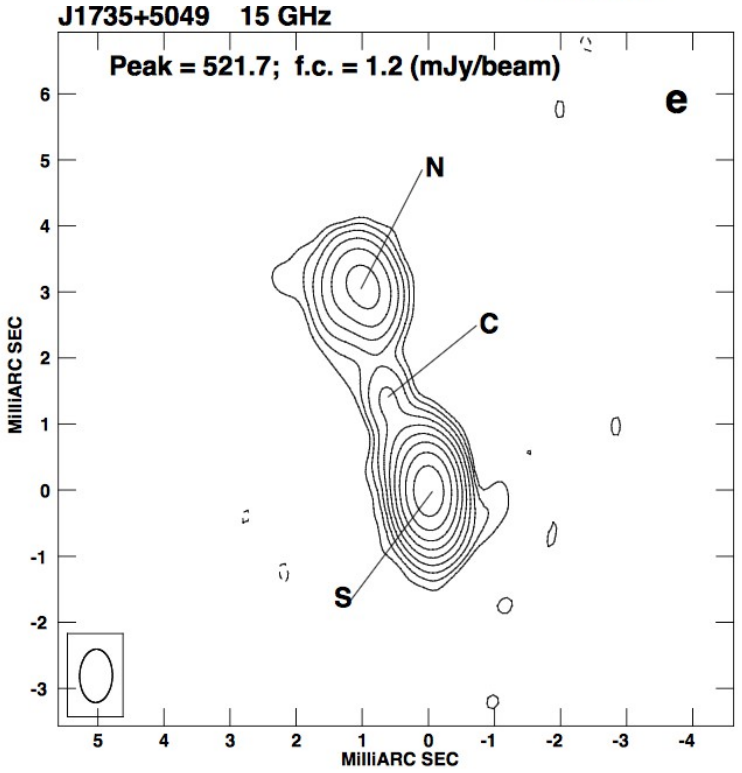
- variability (contamination from non young radio sources)
Progressive depletion of samples as more observations are made.....

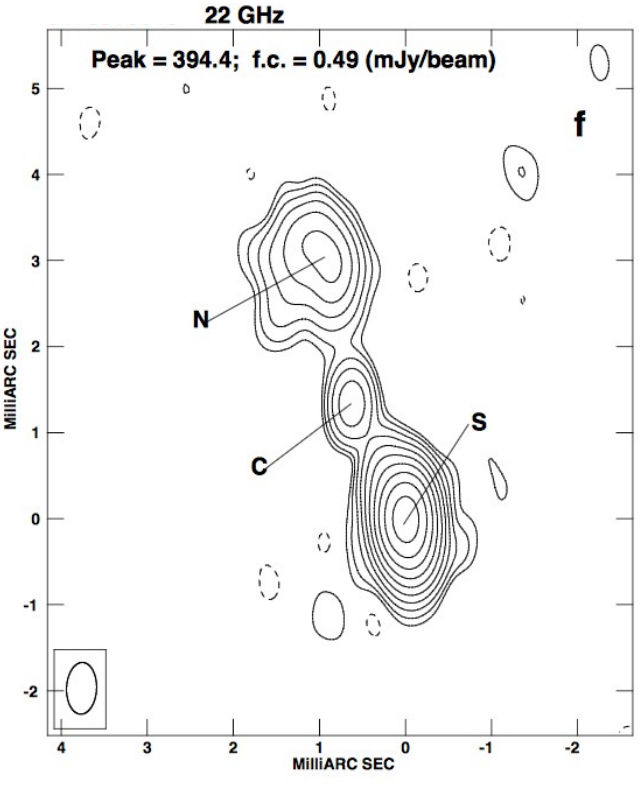
- unpolarized
Boring data reduction, pol cal difficult to accomodate in short obs slots

- milliarcsecond scale size, structure to be observed in the optically thin regime
Small number of resolution elements across the source,--> boring structure
for most of them, but with a few exceptions

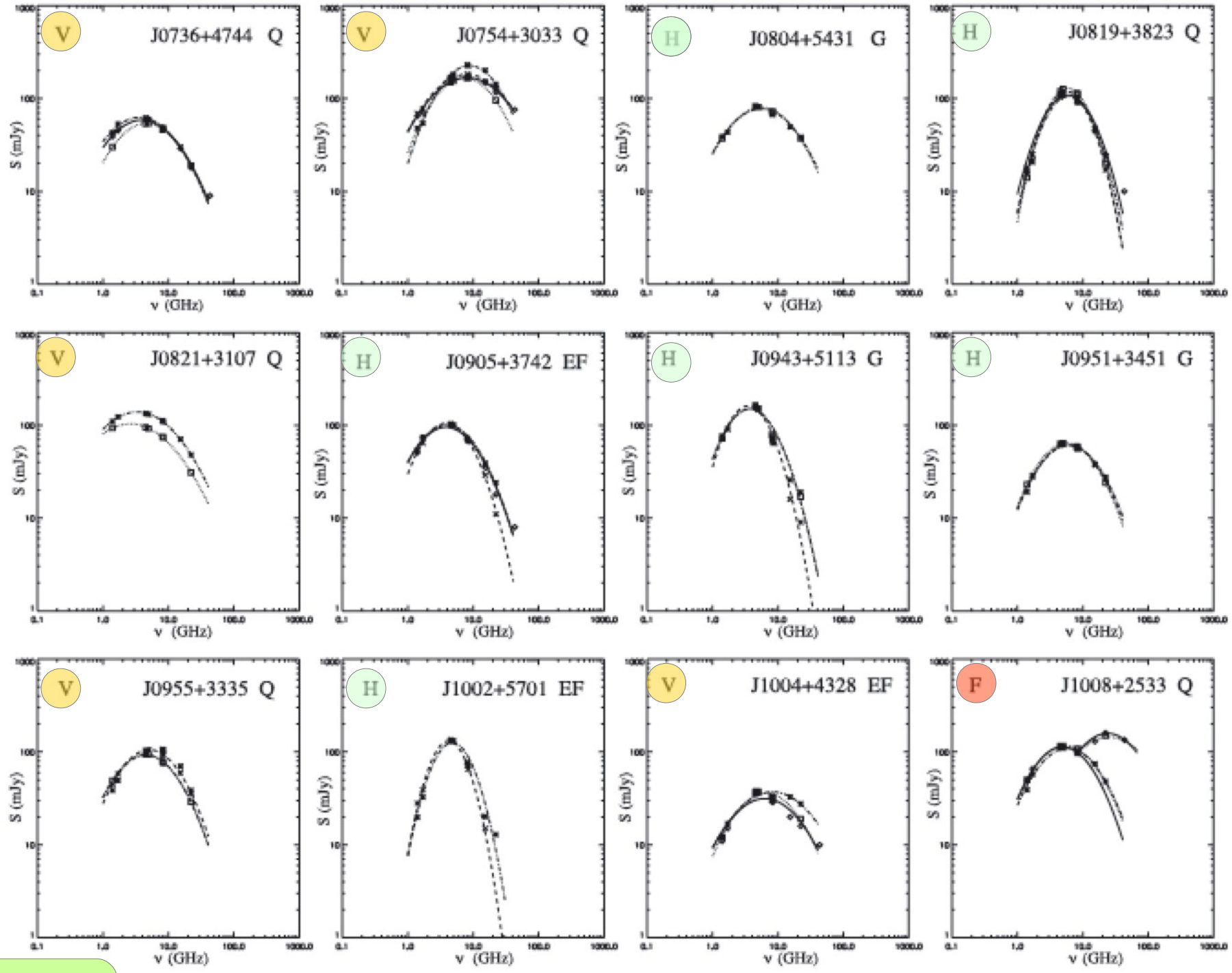








Orienti & Dallacasa 2014



$$V = \frac{1}{m}\sum_{i=1}^{m}\frac{(S_i - S)^2}{\sigma_i^2}$$

Classification: H, V, F (Orienti + 2010)

High Frequency Peakers

Progress (?) report on

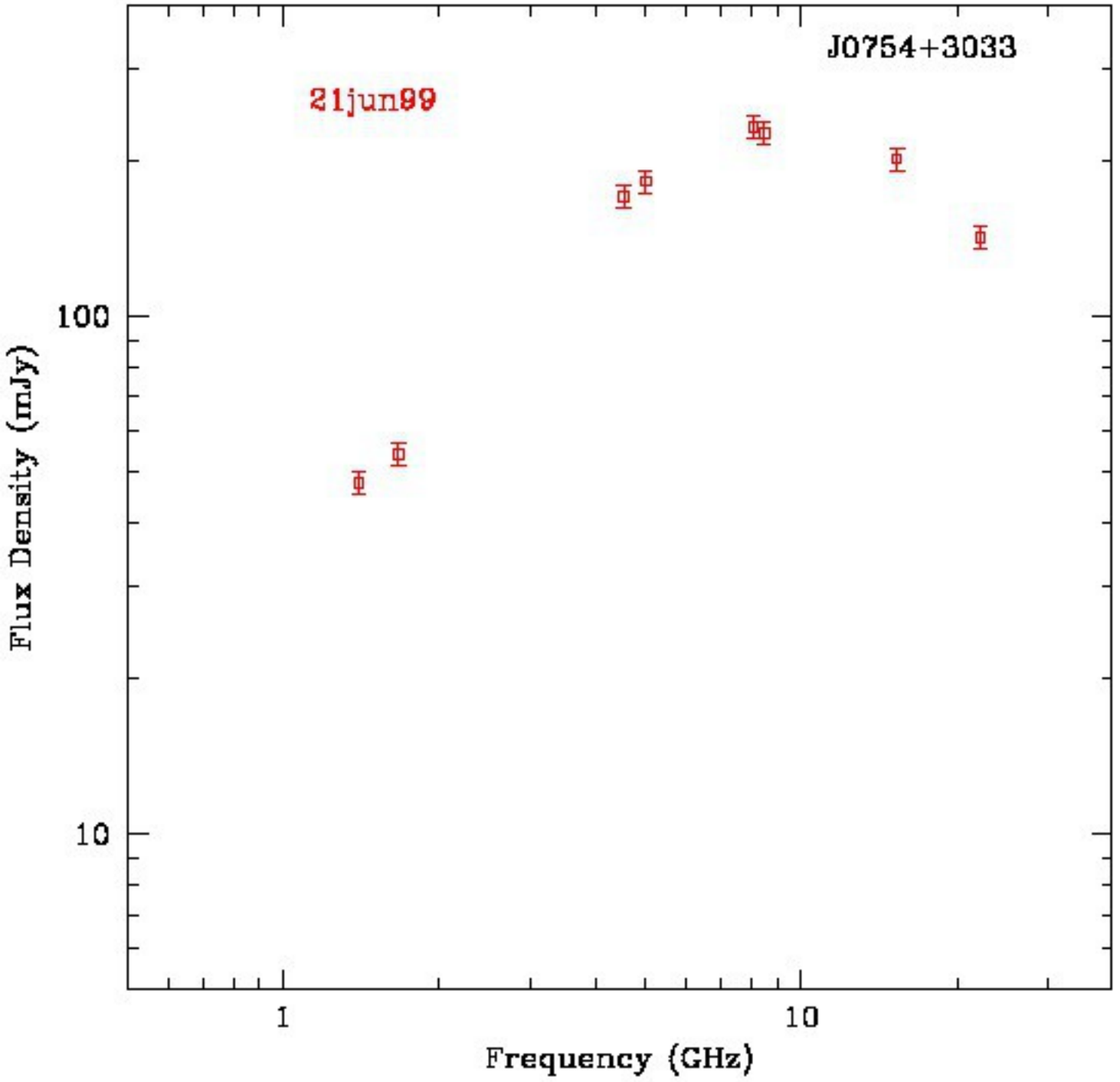
"(J)VLA observations of about 35 faint HFPs"

(regardless their earlier sub-classification as V,F, H)

+ Spectacular spectral coverage: 1-25 GHz (1-45 GHz)
16 IFs per frequency band

- Very short time on source (typically 50 sec)

L band: 2-3 IFs completely flagged out (RFI). A few with some residual RFI
S band: 2 IFs completely flagged out (RFI)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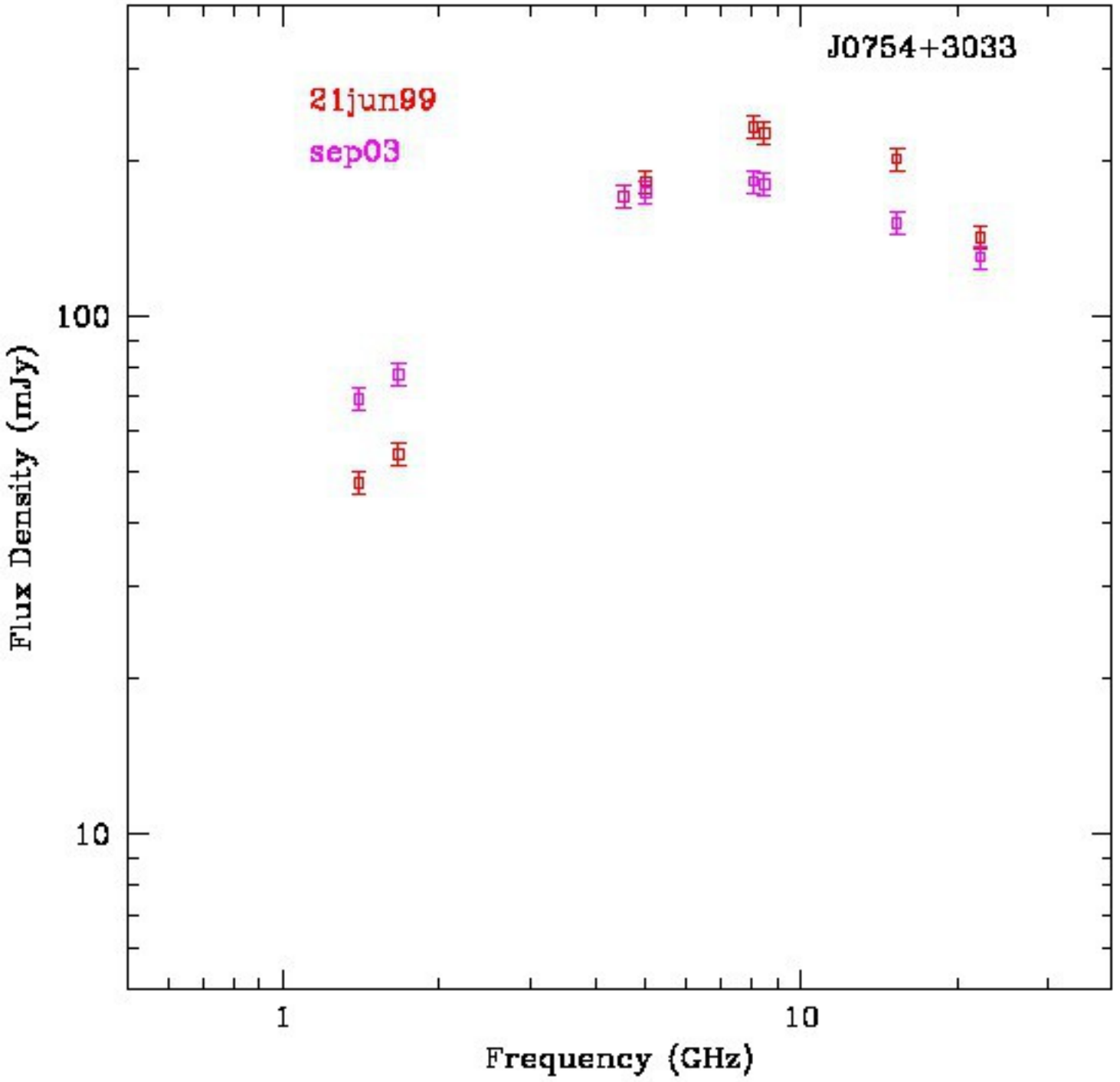
21jun99
100
10
Flux Density (mJy)
1
10
Frequency (GHz)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sep03
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10
Flux Density (mJy)
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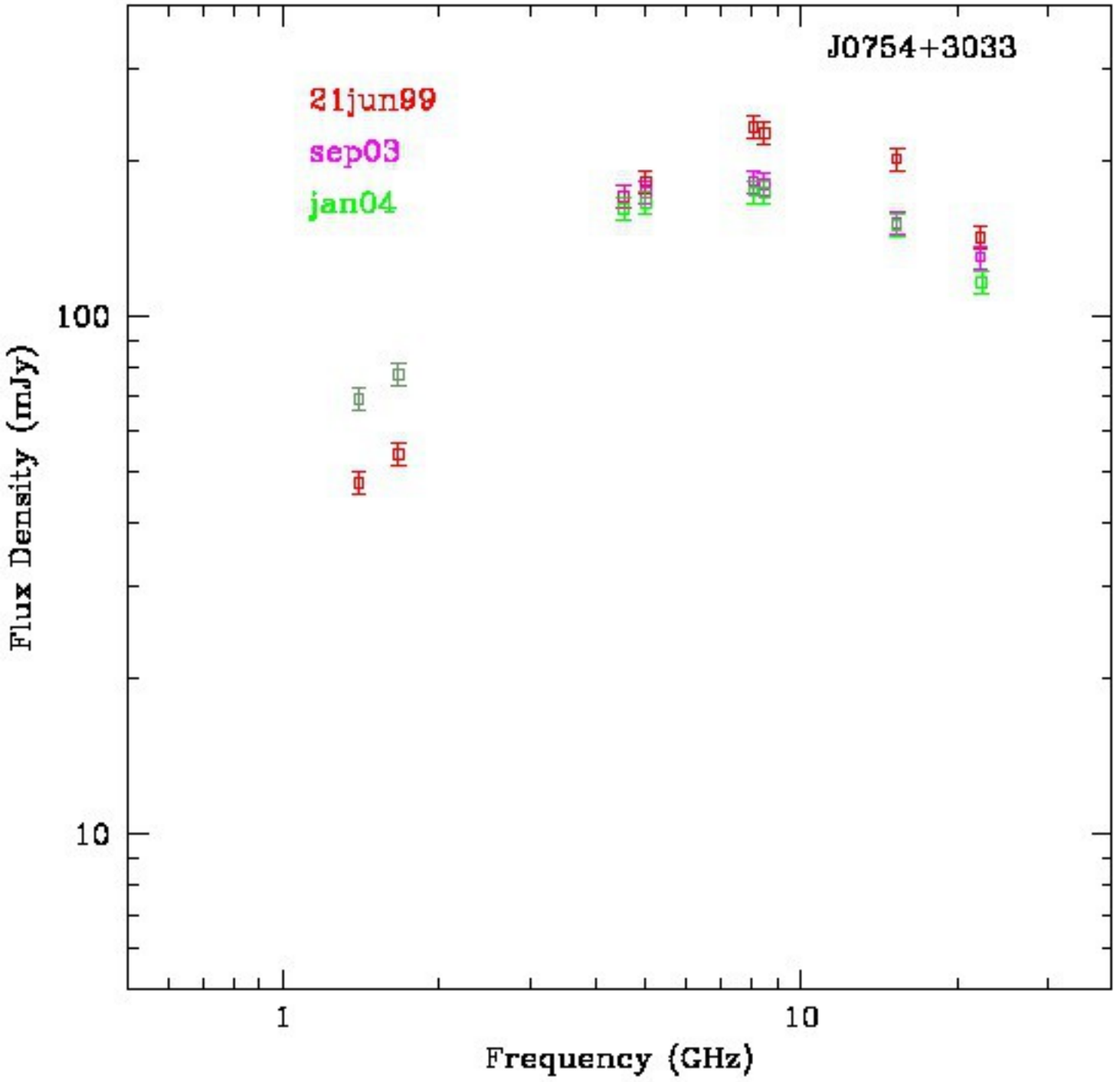
10
Frequency (GHz)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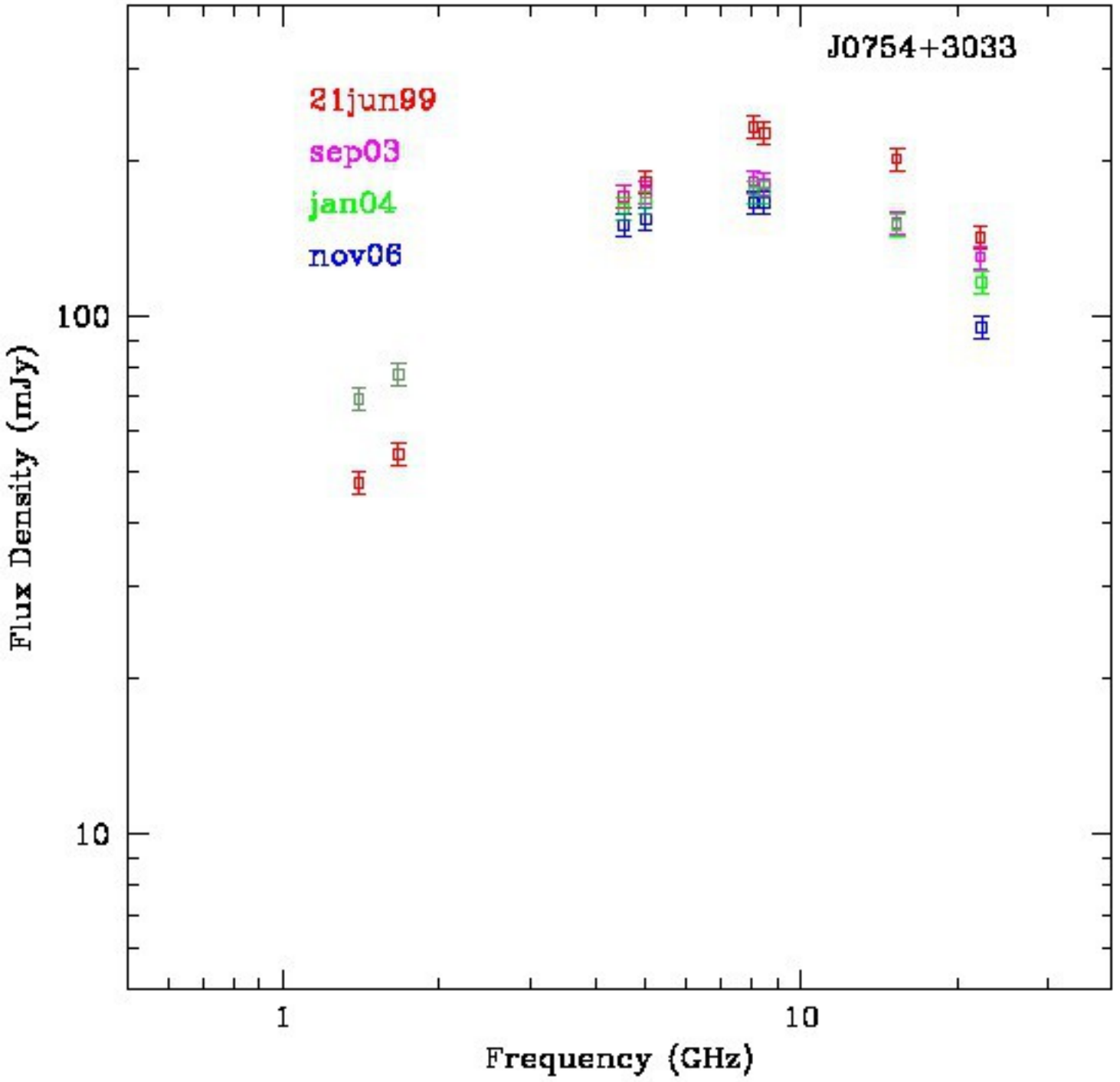
21jun99
sep03
jan04
100
10
Flux Density (mJy)
1
10
Frequency (GHz)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Flux Density (mJy)
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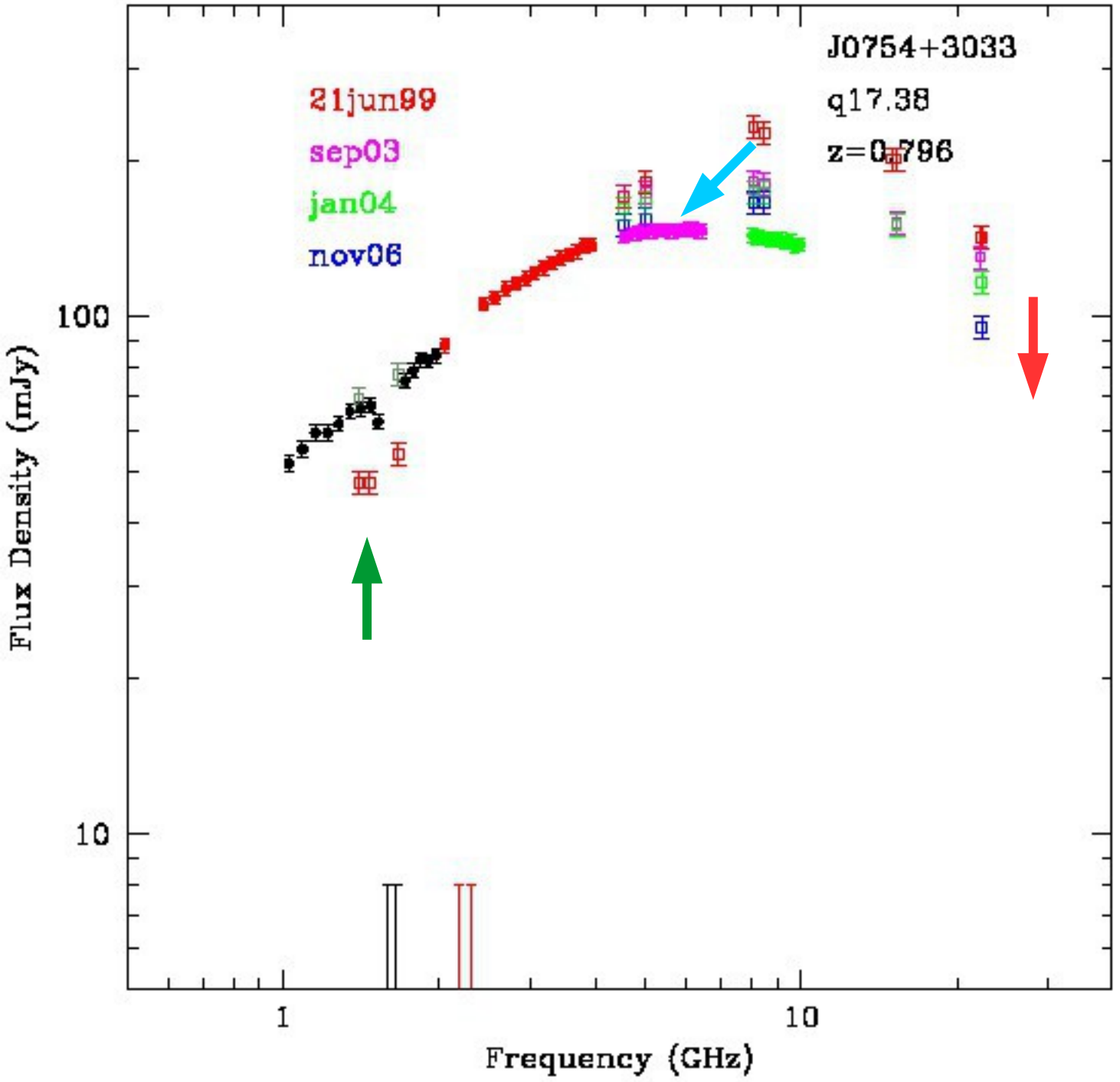
Frequency (GHz)


J0754+3033
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Flux Density (mJy)
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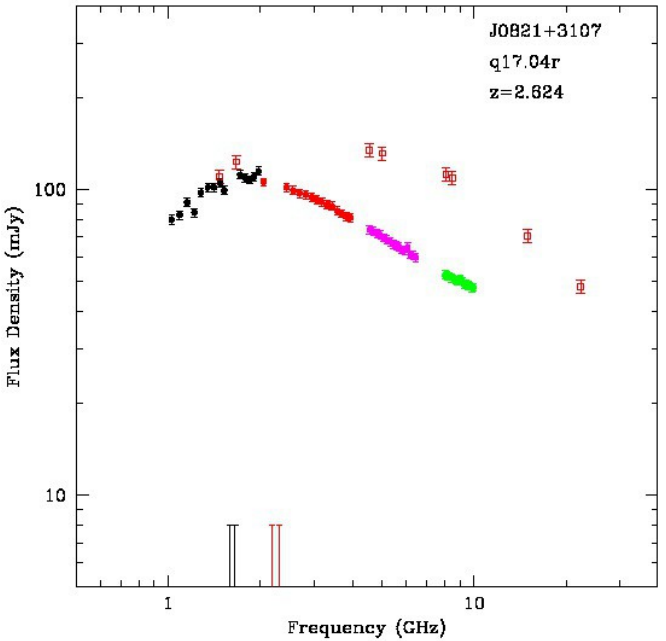
10
Frequency (GHz)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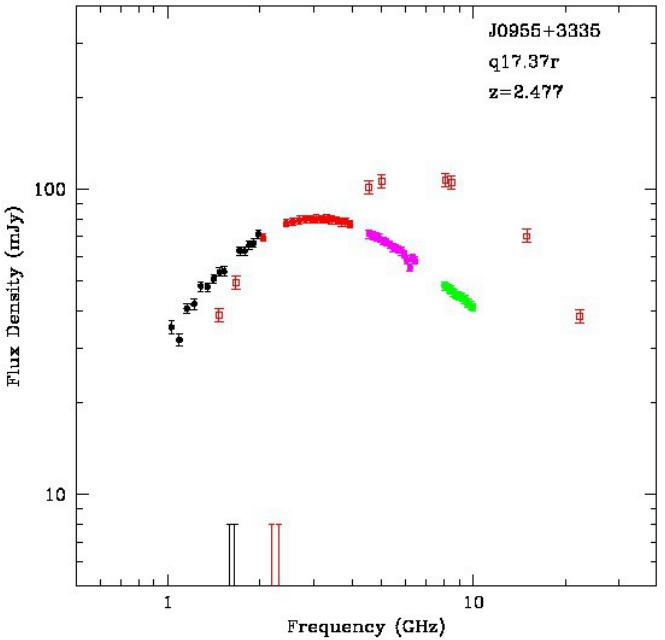
Frequency (GHz)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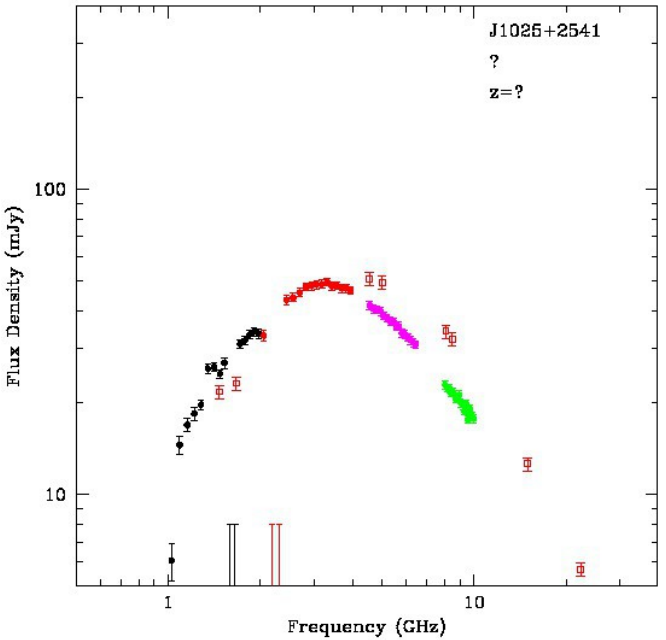
Frequency (GHz)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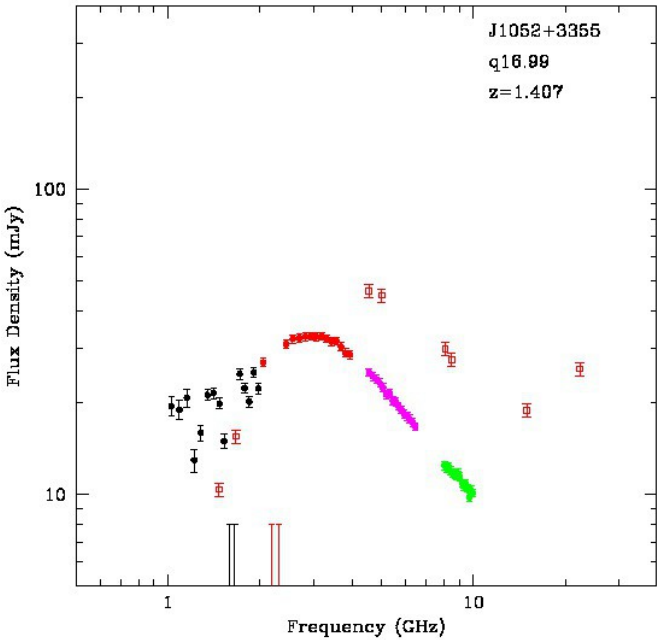
10
1
10
Frequency (GHz)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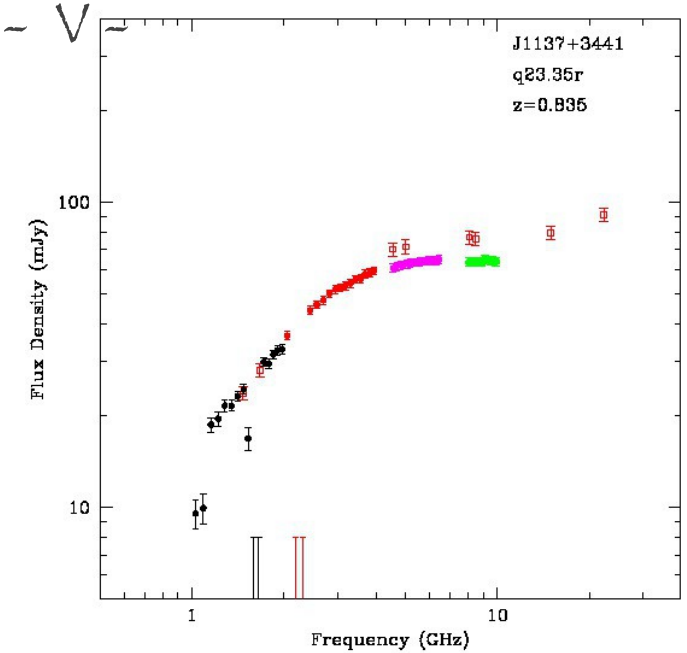
1
10
Frequency (GHz)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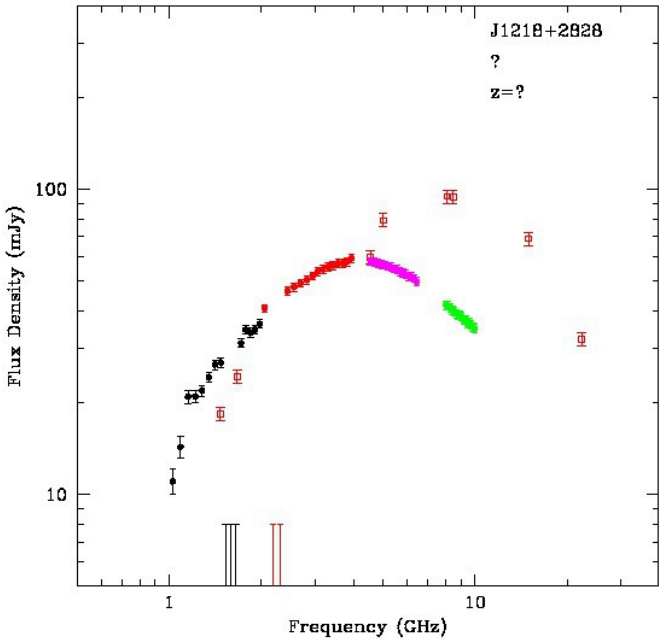
q23.35r
z=0.835
Flux Density (mJy)
Frequency (GHz)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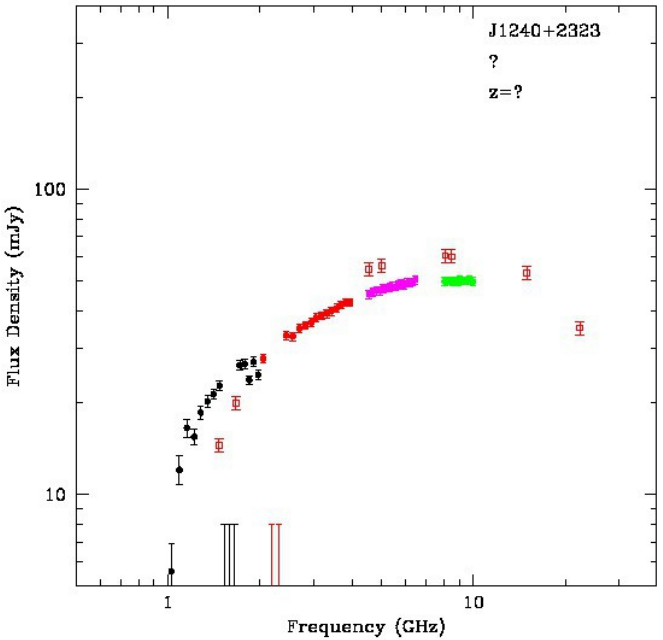
Flux Density (mJy)
Frequency (GHz)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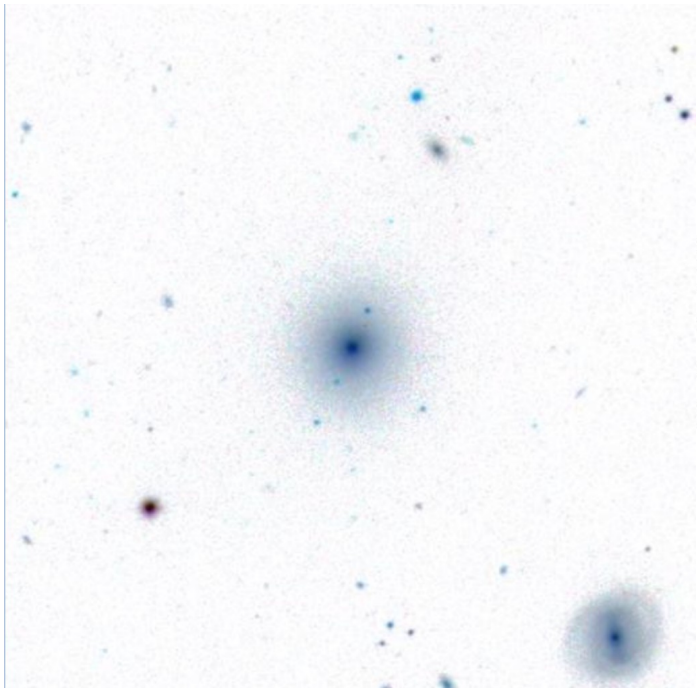
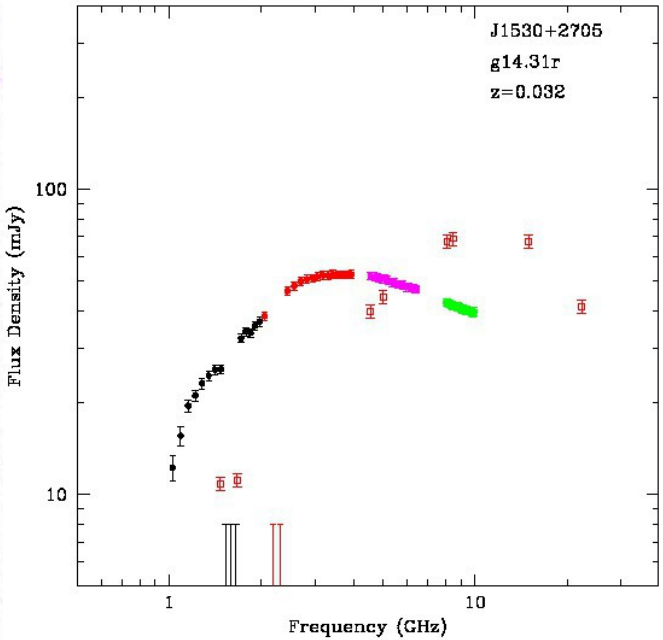
z=?
Flux Density (mJy)
Frequency (GHz)

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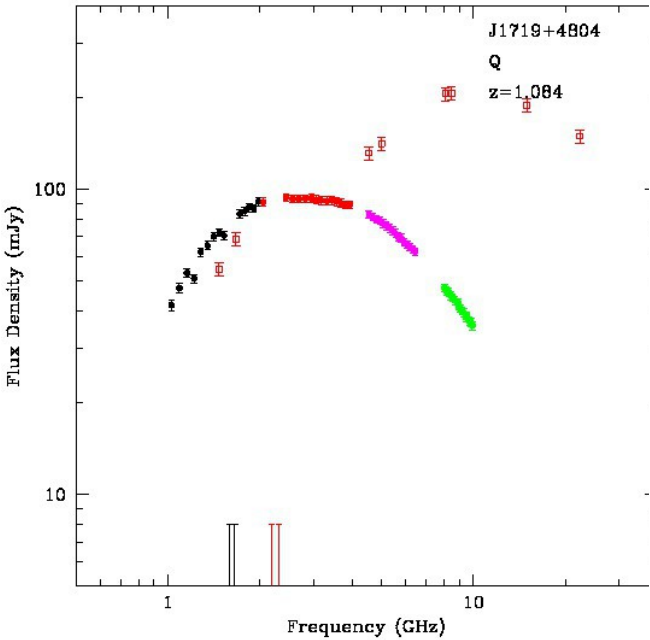
Flux Density (mJy)
Frequency (GHz)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Q
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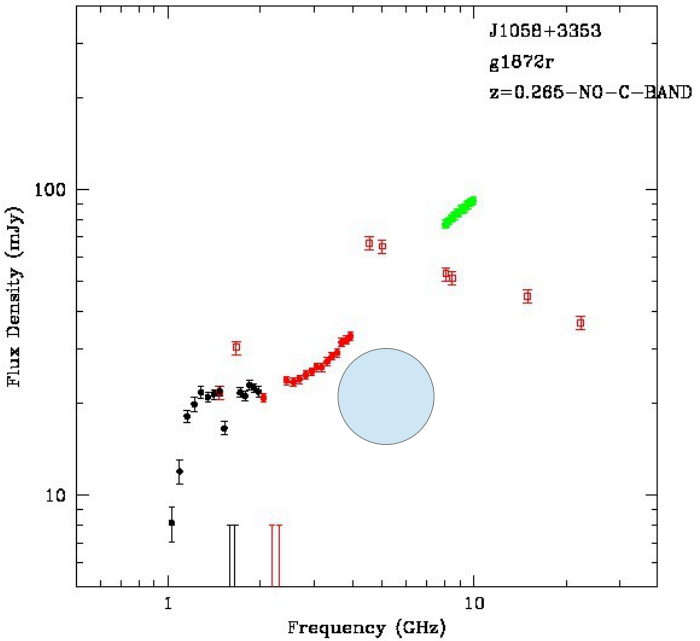
Frequency (GHz)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100
10
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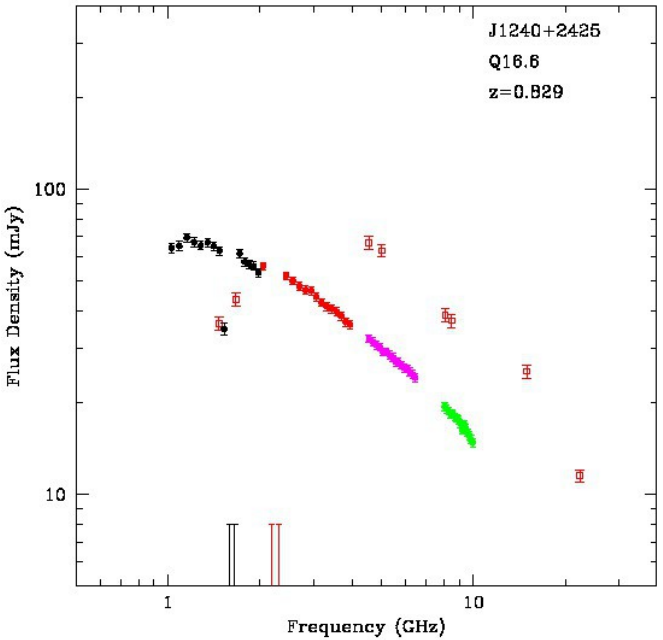
10
Frequency (GHz)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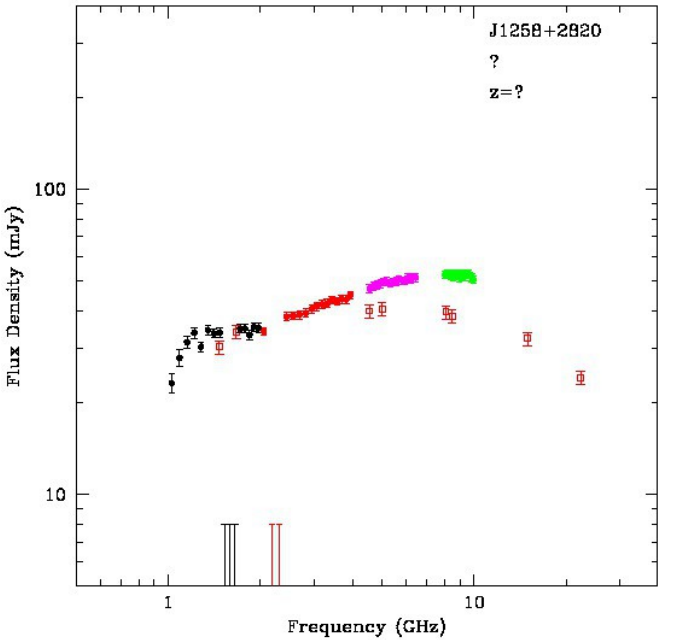
Frequency (GHz)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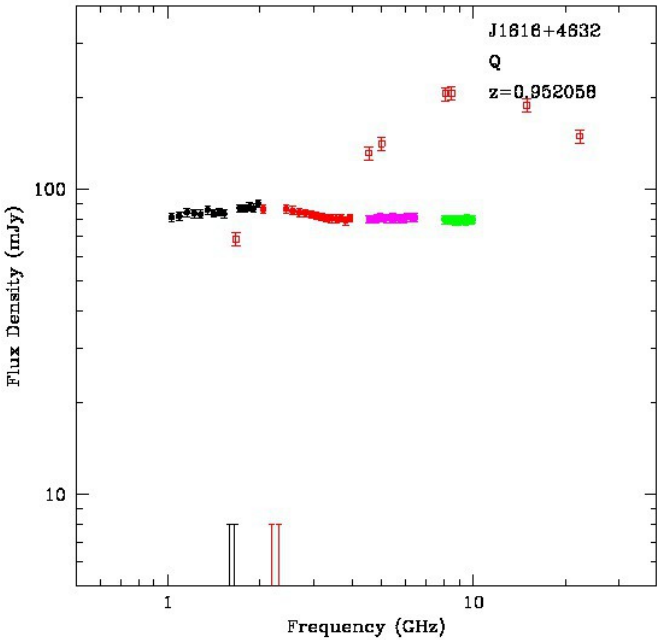
Frequency (GHz)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Q
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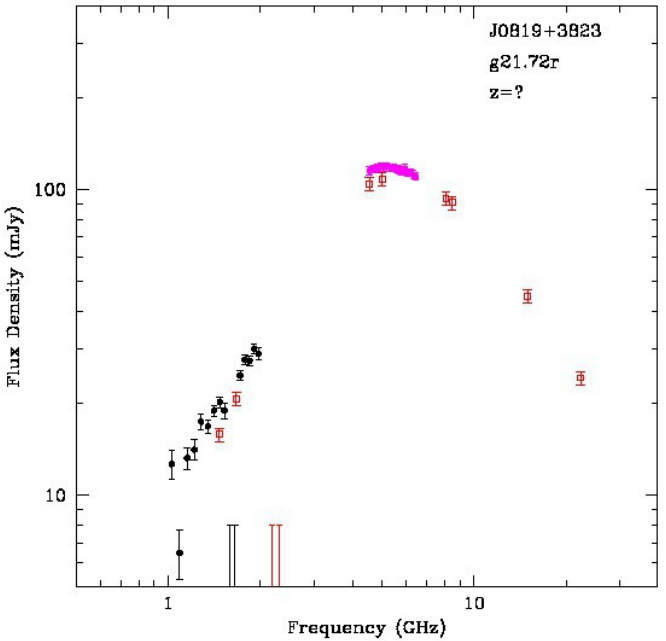
10
Flux Density (mJy)
1
10
Frequency (GHz)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z=?
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Flux Density (mJy)
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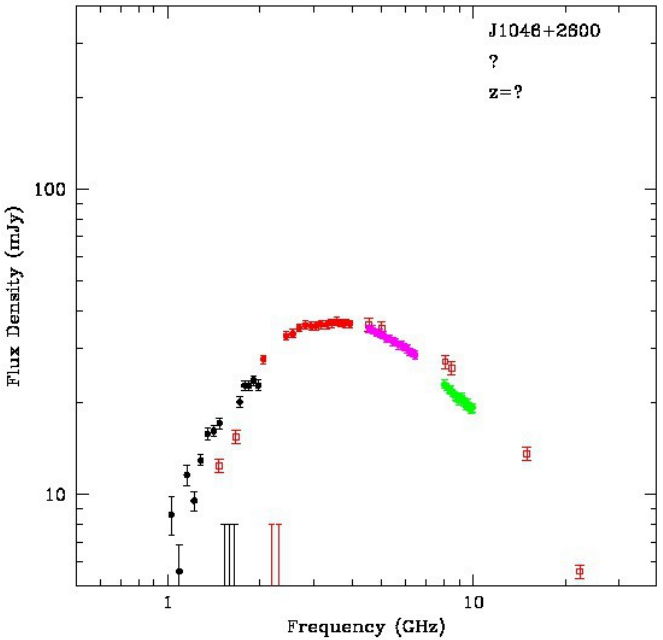
10
Frequency (GHz)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Flux Density (mJy)
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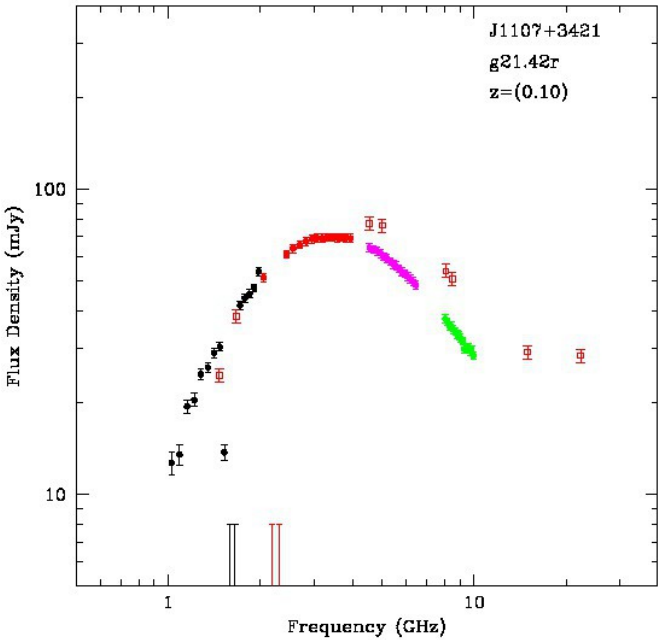
10
Frequency (GHz)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Flux Density (mJy)
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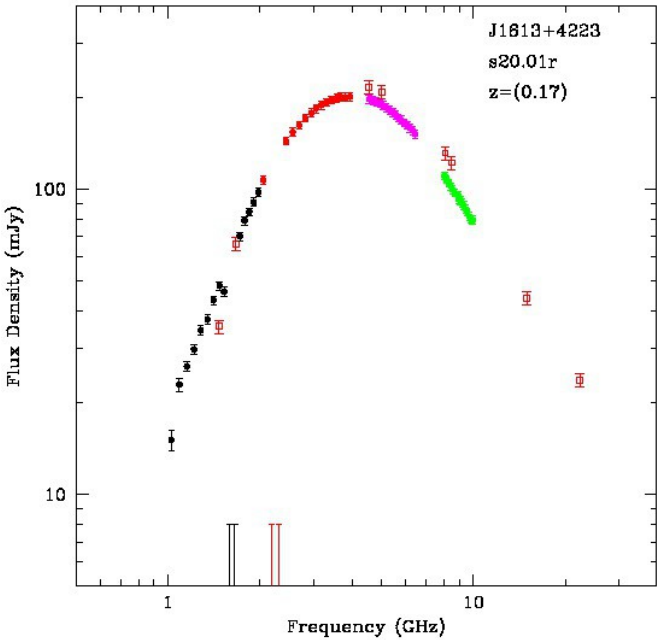
Frequency (GHz)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Flux Density (mJy)
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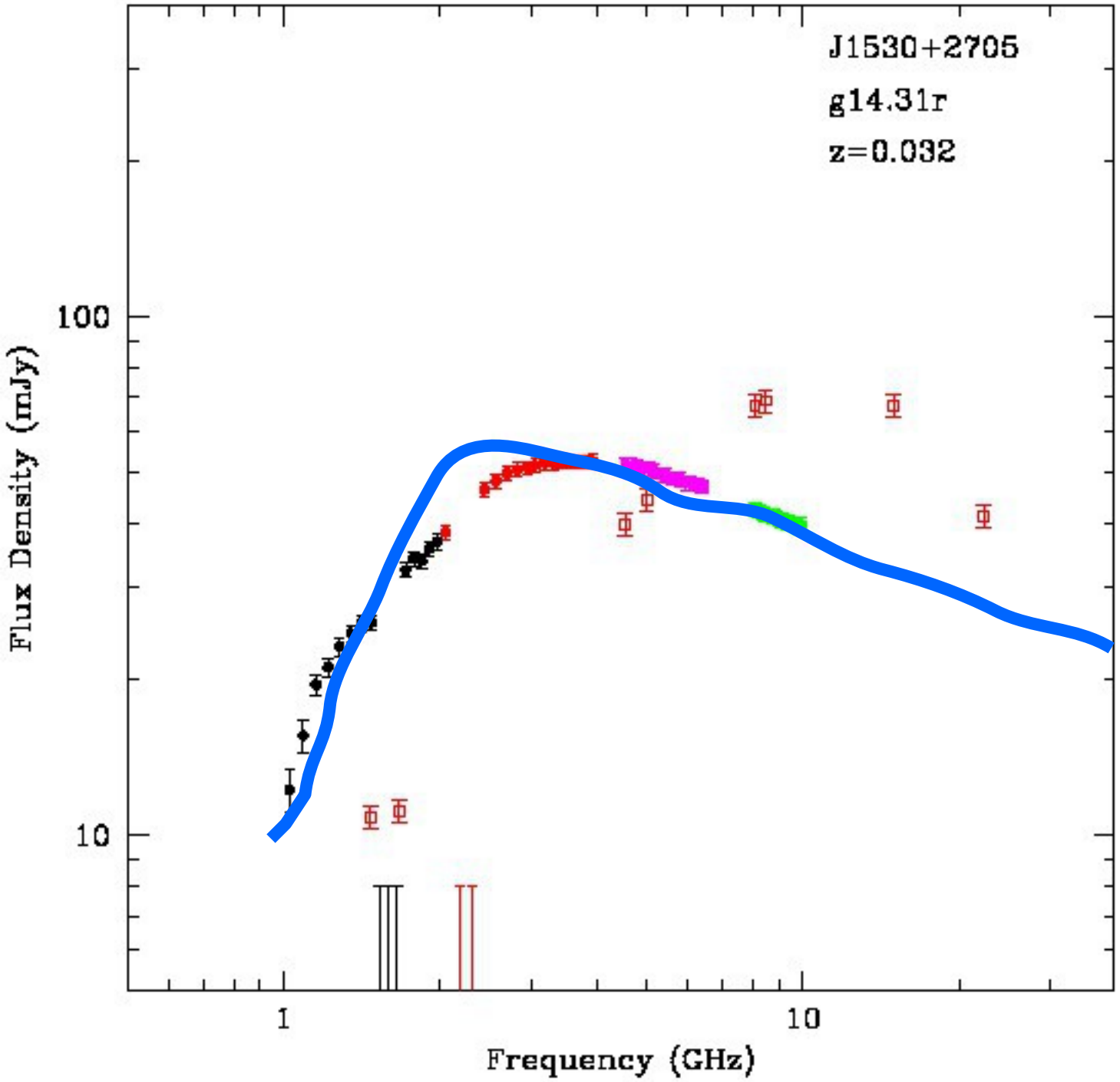
10
Frequency (GHz)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Flux Density (mJy)
1
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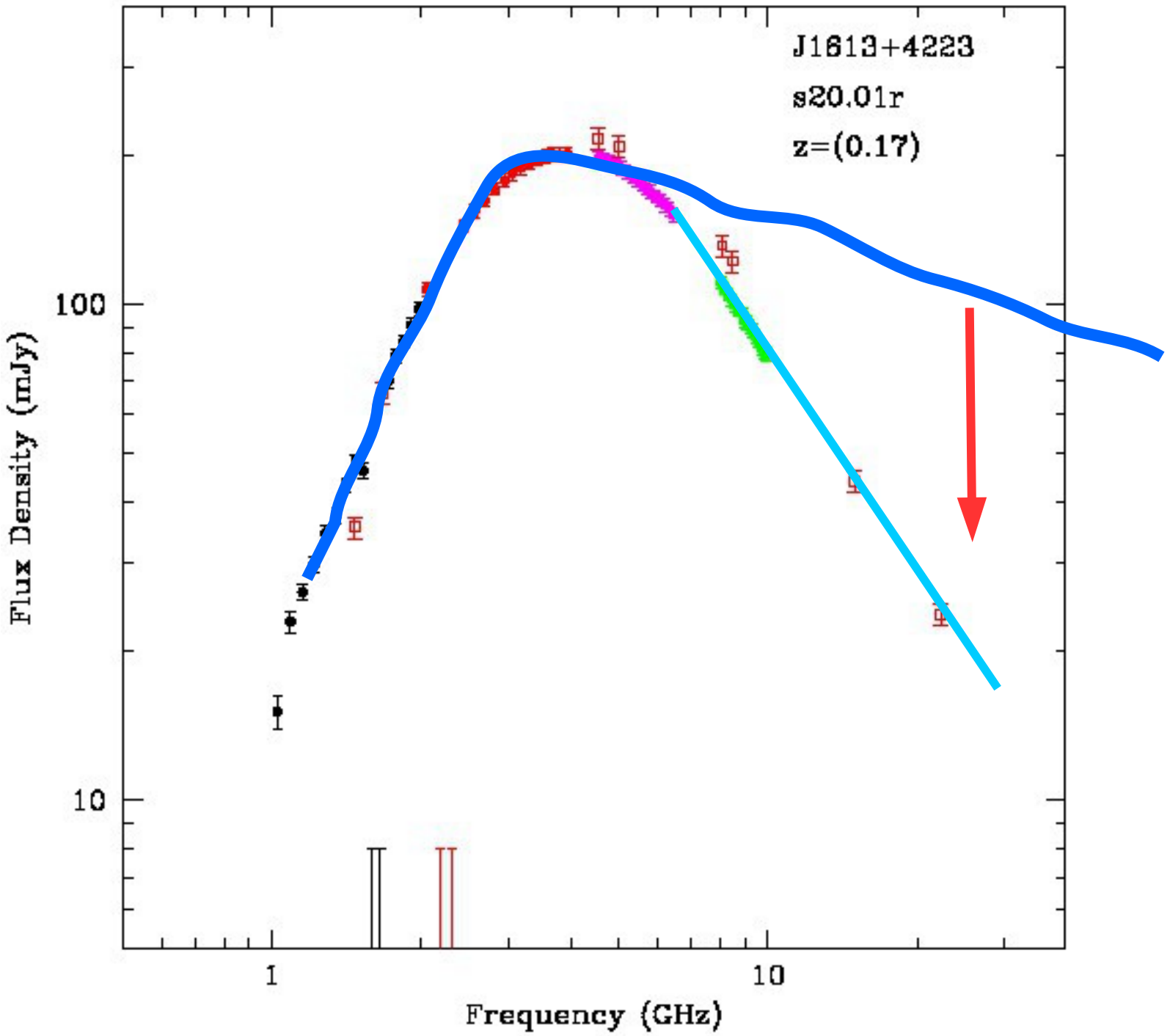
Frequency (GHz)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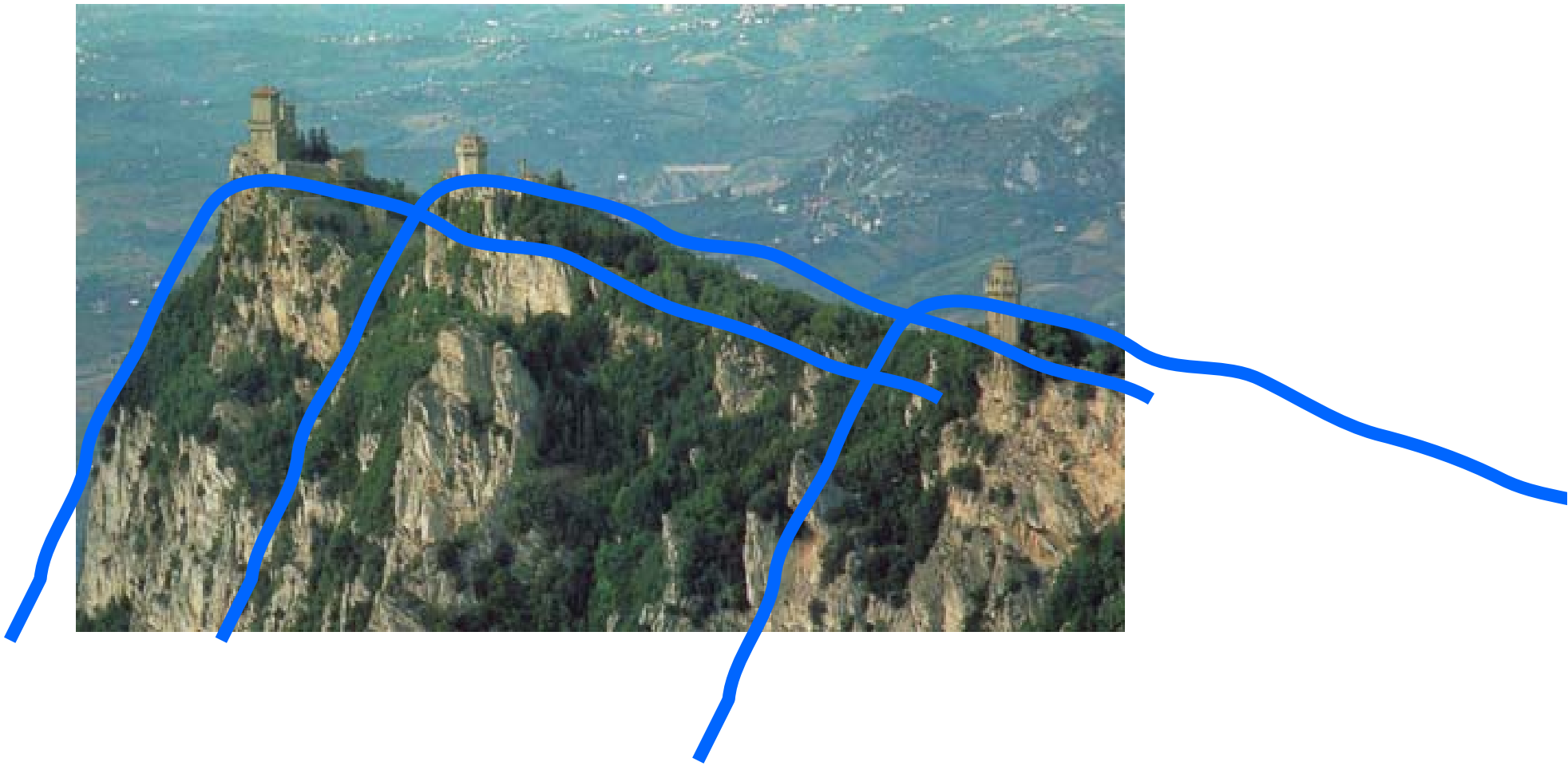
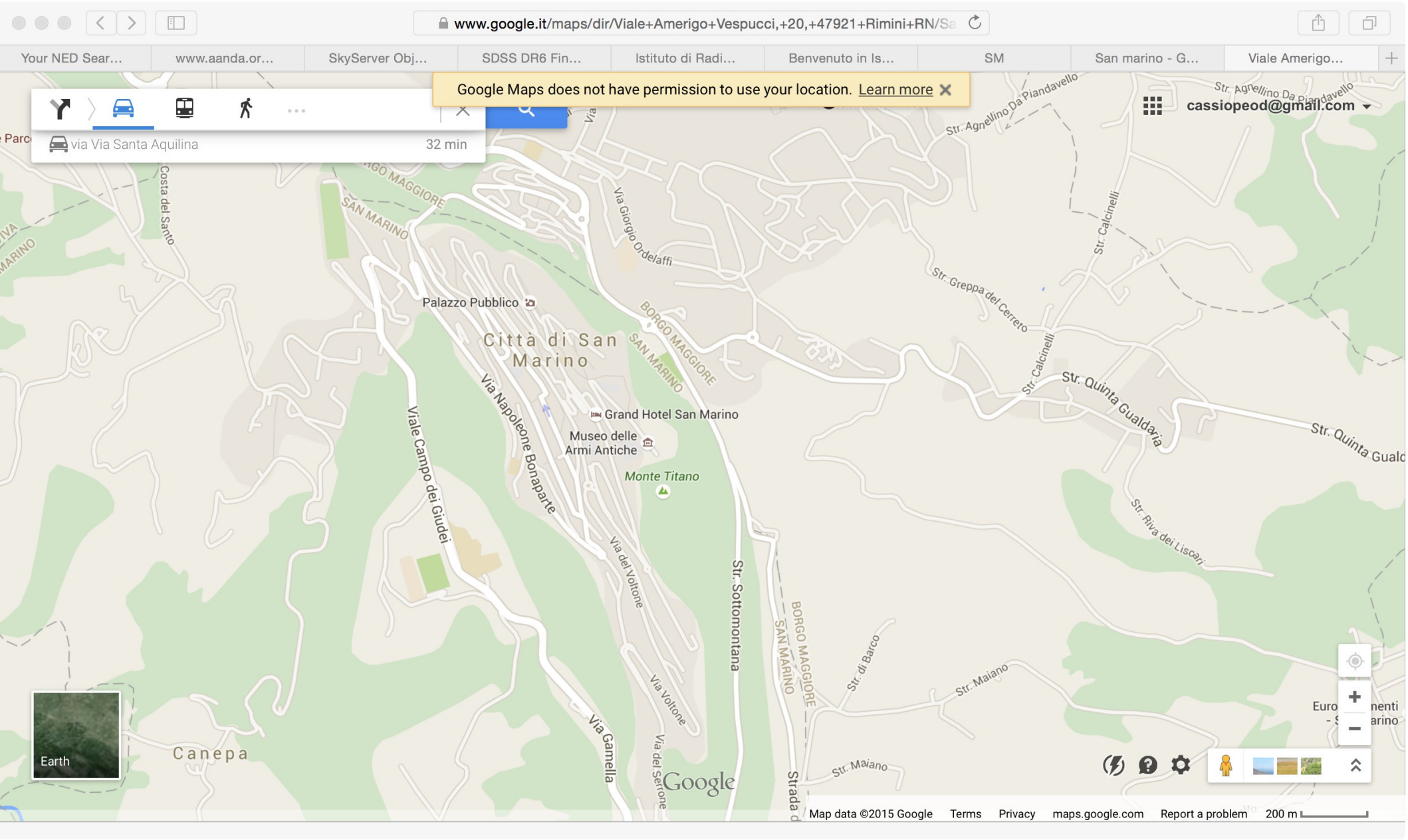
Flux Density (mJy)
1
10
Frequency (GHz)

X axis: Log (frequency)



X axis: Log (wavelength)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www.aanda.or...
SkyServer Obj...
SDSS DR6 Fin...
Istituto di Radi...
Benvenuto in Is...
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Palazzo Pubblico
Grand Hotel San Marino
Museo delle Armi Antiche
Monte Titano
Via Napoleone Bonaparte
Viale Campo dei Giudei
Via del Voltone
Via Gamella
Str. Sottomontana
Str. Quinta Gualdaria
Str. Greppa del Cerreto
Str. Calcinelli
Str. Agnellino Da Piandavello
Str. Riva dei Liscari
Str. di Barco
Str. Maiano
Via Giorgio Ordelaffi
Costa del Santo
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SAN MARINO
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Privacy
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Report a problem
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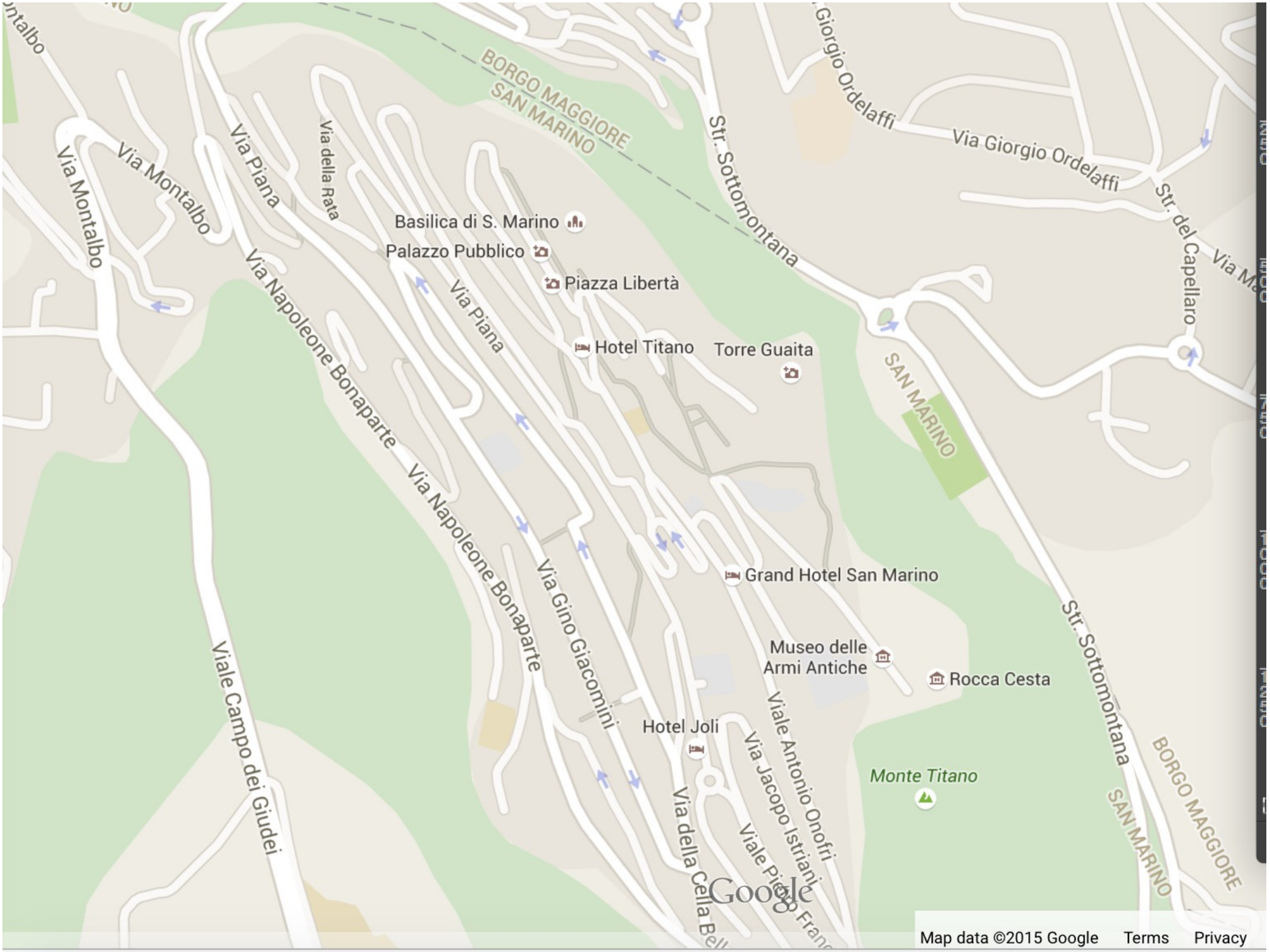
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Hotel Titano
Torre Guaita
Str. Sottomontana
Giorgio Ordelaffi
Via Giorgio Ordelaffi
Str. del Capellaro
SAN MARINO
Grand Hotel San Marino
Via Gino Giacomini
Museo delle
Armi Antiche
Rocca Cesta
Hotel Joli
Viale Antonio Onofri
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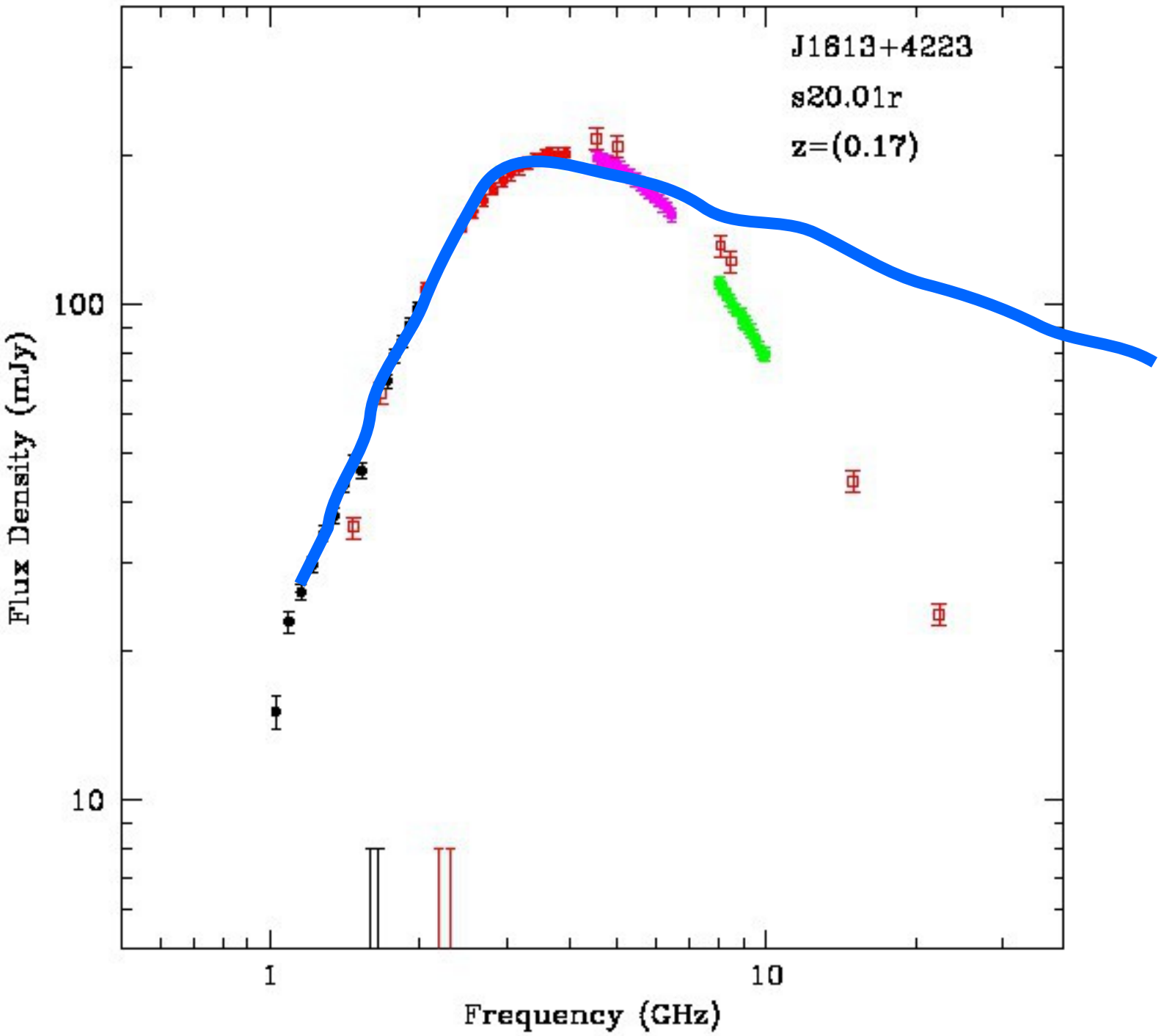
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s20.01r
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100
10
Flux Density (mJy)
1
10
Frequency (GHz)

High Frequency Peakers

"(J)VLA observations of about 35 faint HFPS"

Summary

Facts and speculations

Most of the spectra are peaked (one flat)

F sources are likely to be blazar – like objects

V sources can be generally considered HFP

H sources are less variable than V and their spectra are "more peaked"

Optically thick spectral indices are between -2.5 and -0.smth $S \sim \nu^{-\alpha}$

Optically thin spectral indices are rather steep

typical of "old electron populations"/inactive objects

Spectra with continuous curvature

Discontinuous activity on short timescales, averaged up in older objects