

# Towards the first generation of Radio Powerful AGN in the Universe

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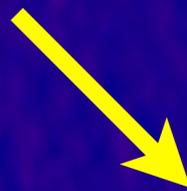
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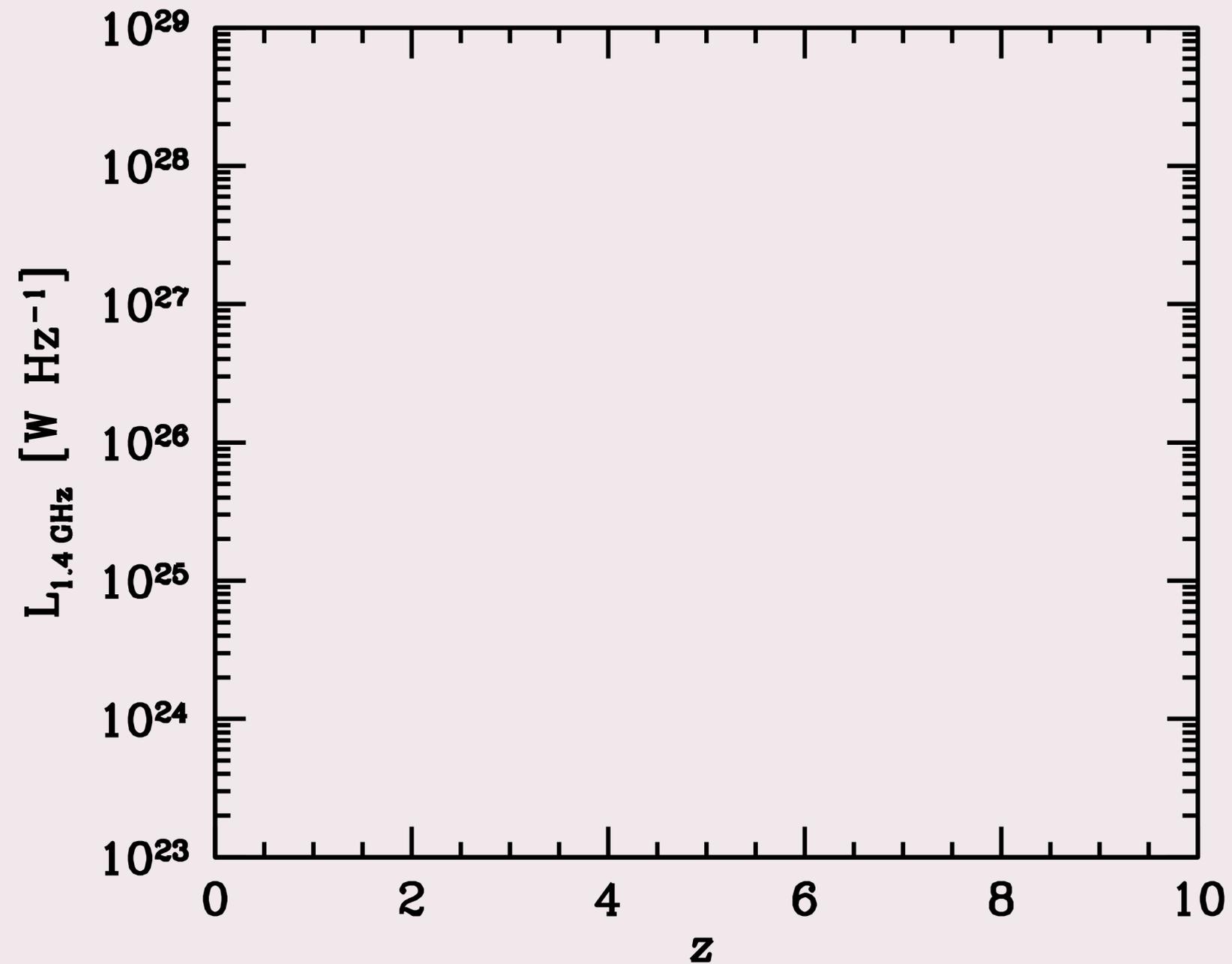


Where are the first powerful radio galaxies?

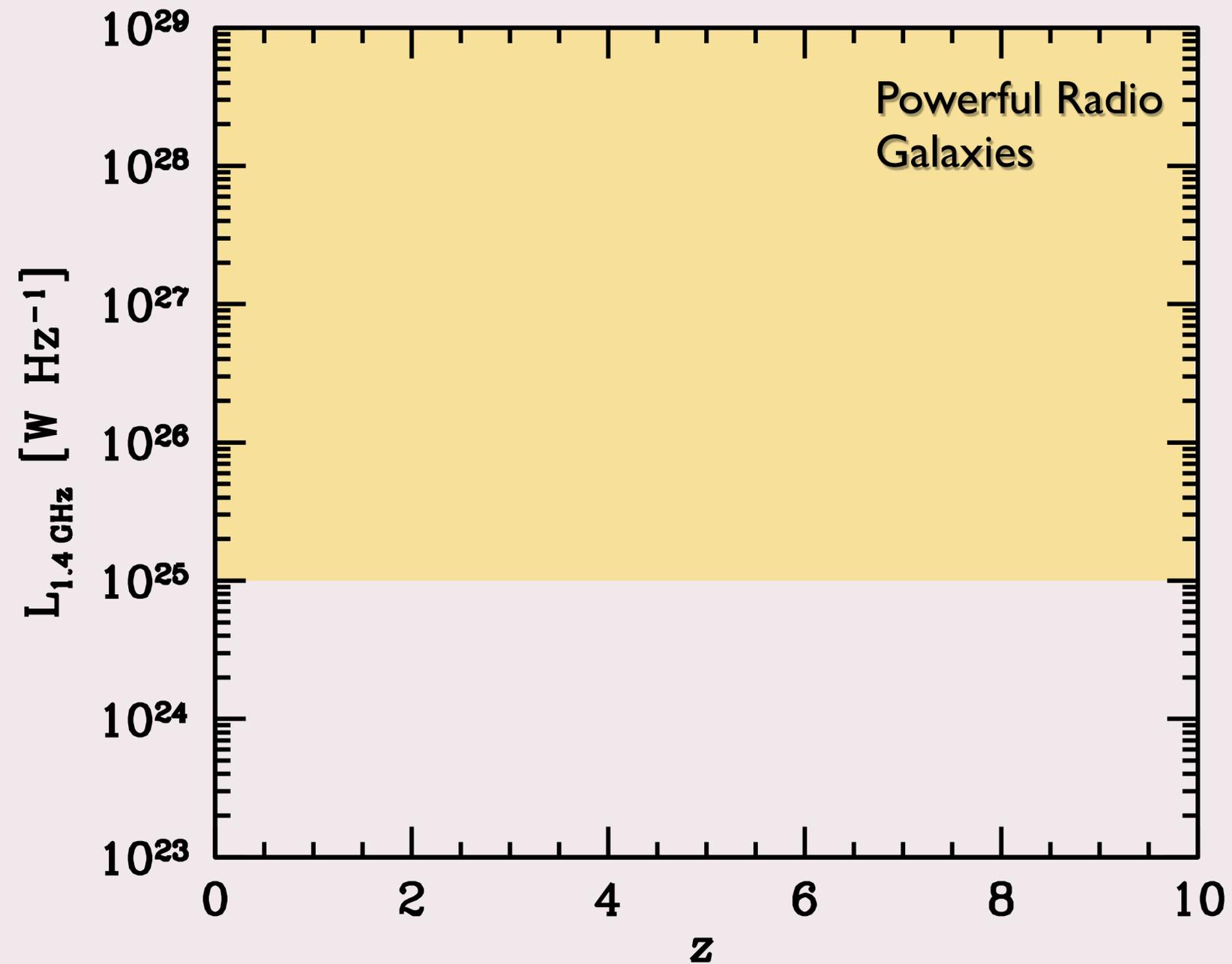
# Where are the first powerful radio galaxies?

- How do SMBHs grow in few  $\times 100$ 's Myr?
- What is the role of early black holes as seeds of galaxy formation.
- What are the sources of reionization of the Universe?
- How does HI evolve in the EoR?

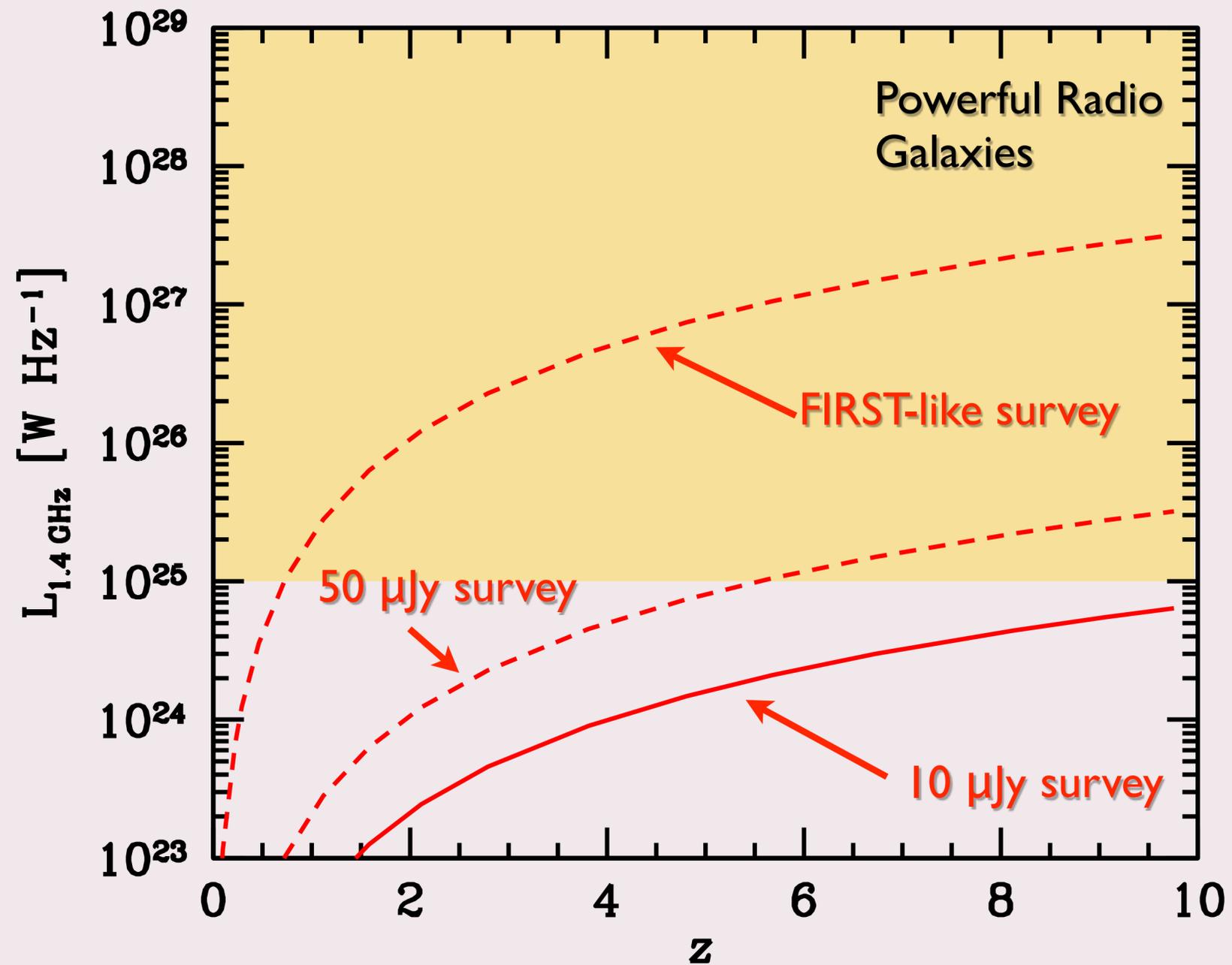
# The radio road to the highest redshifts



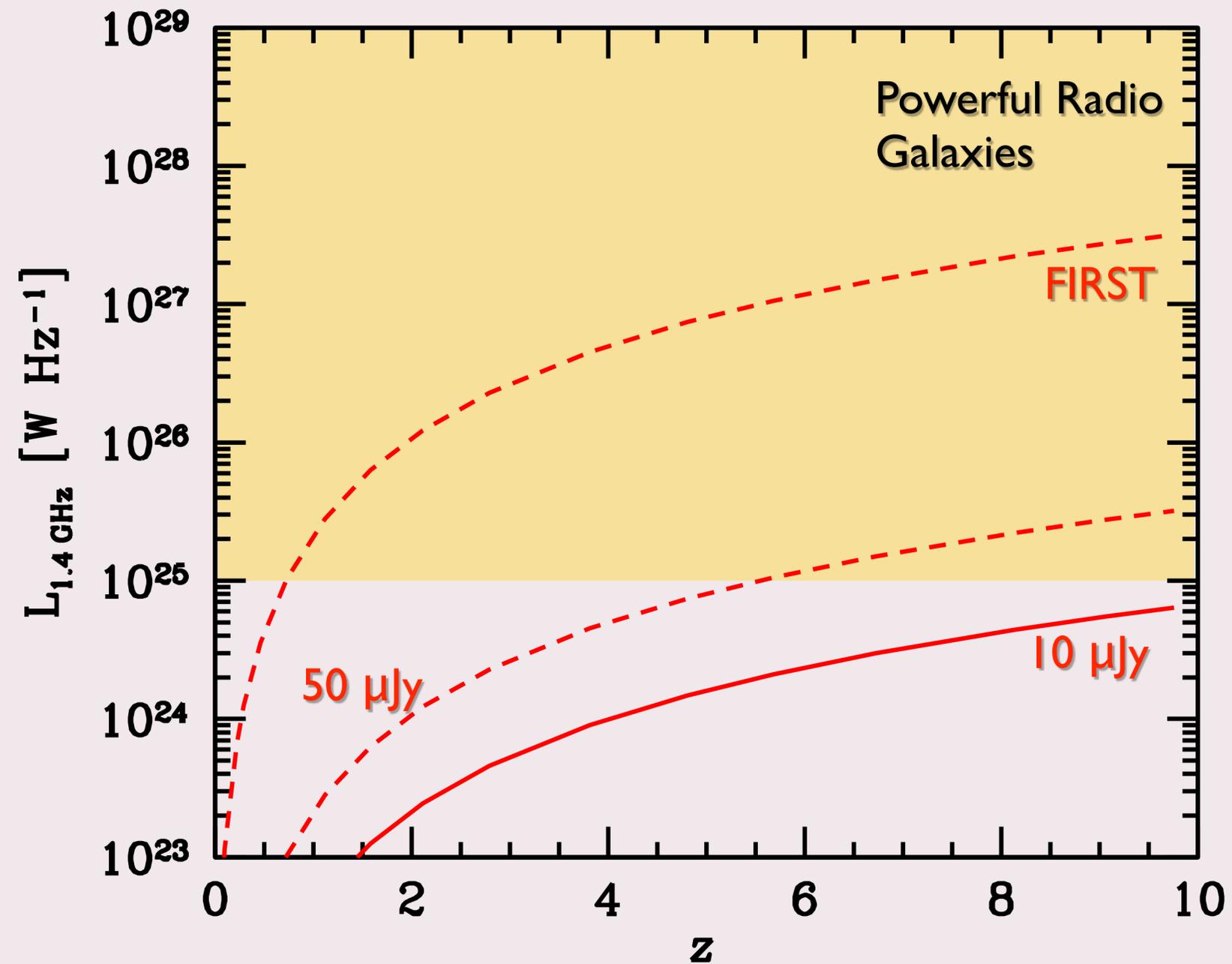
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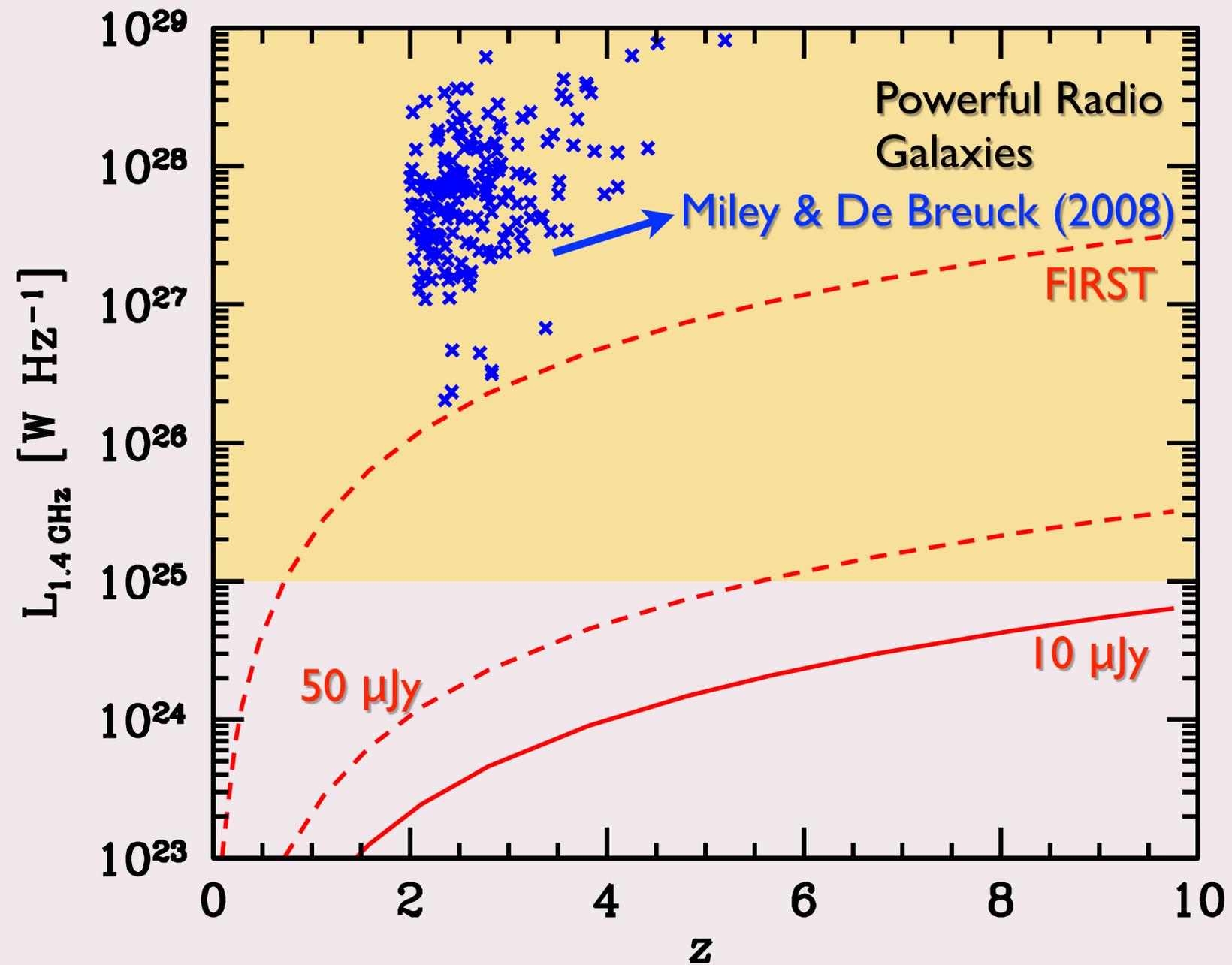
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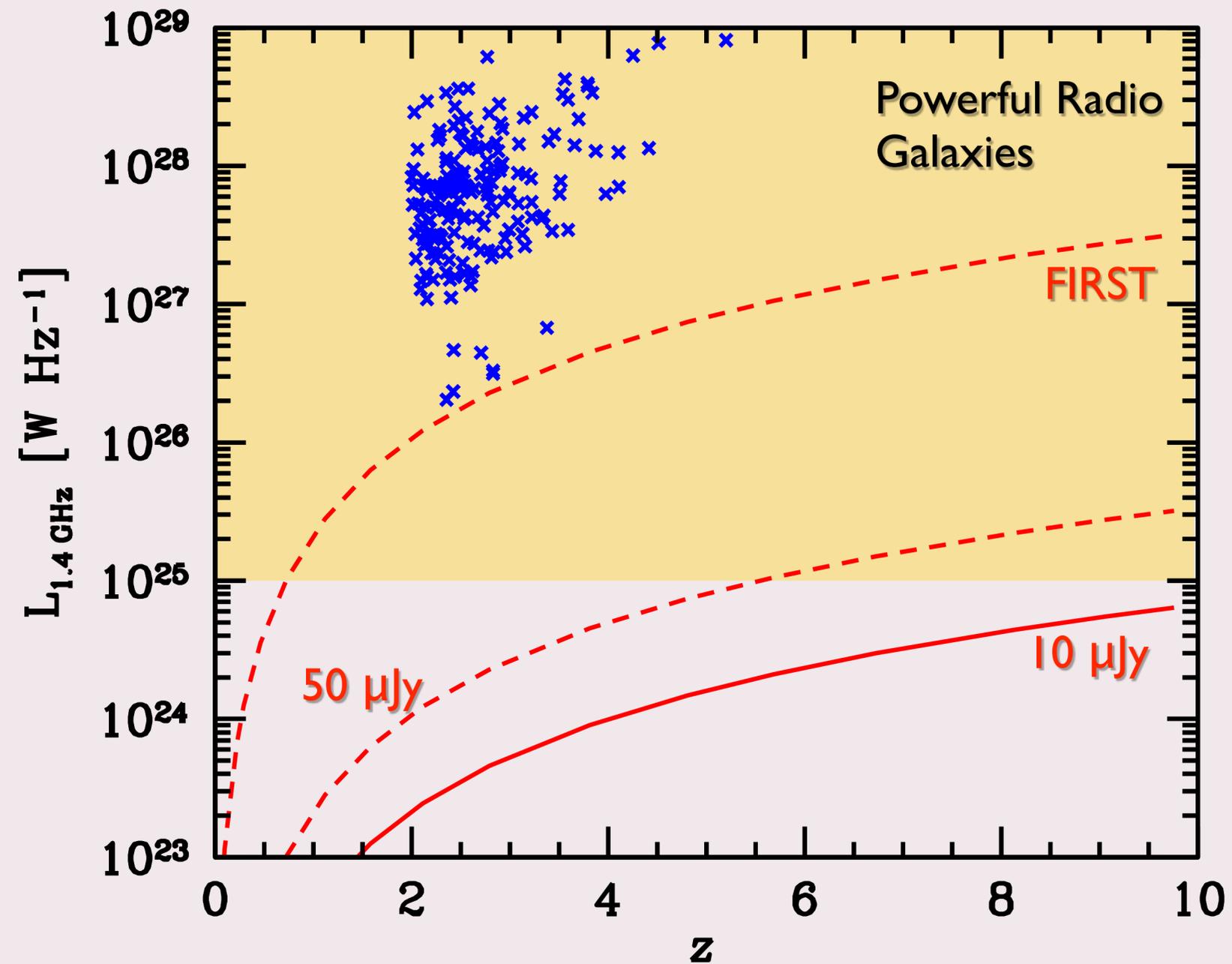
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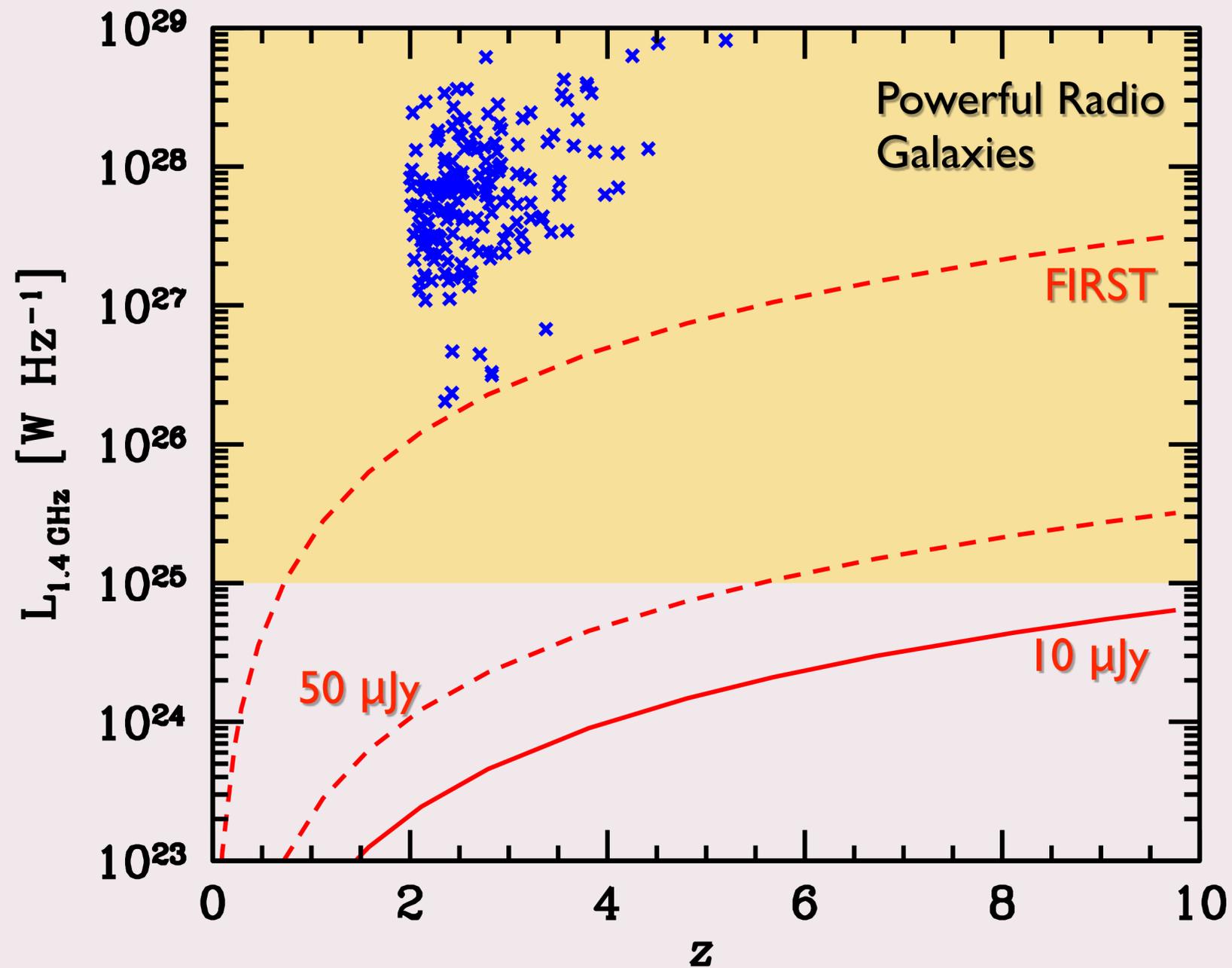
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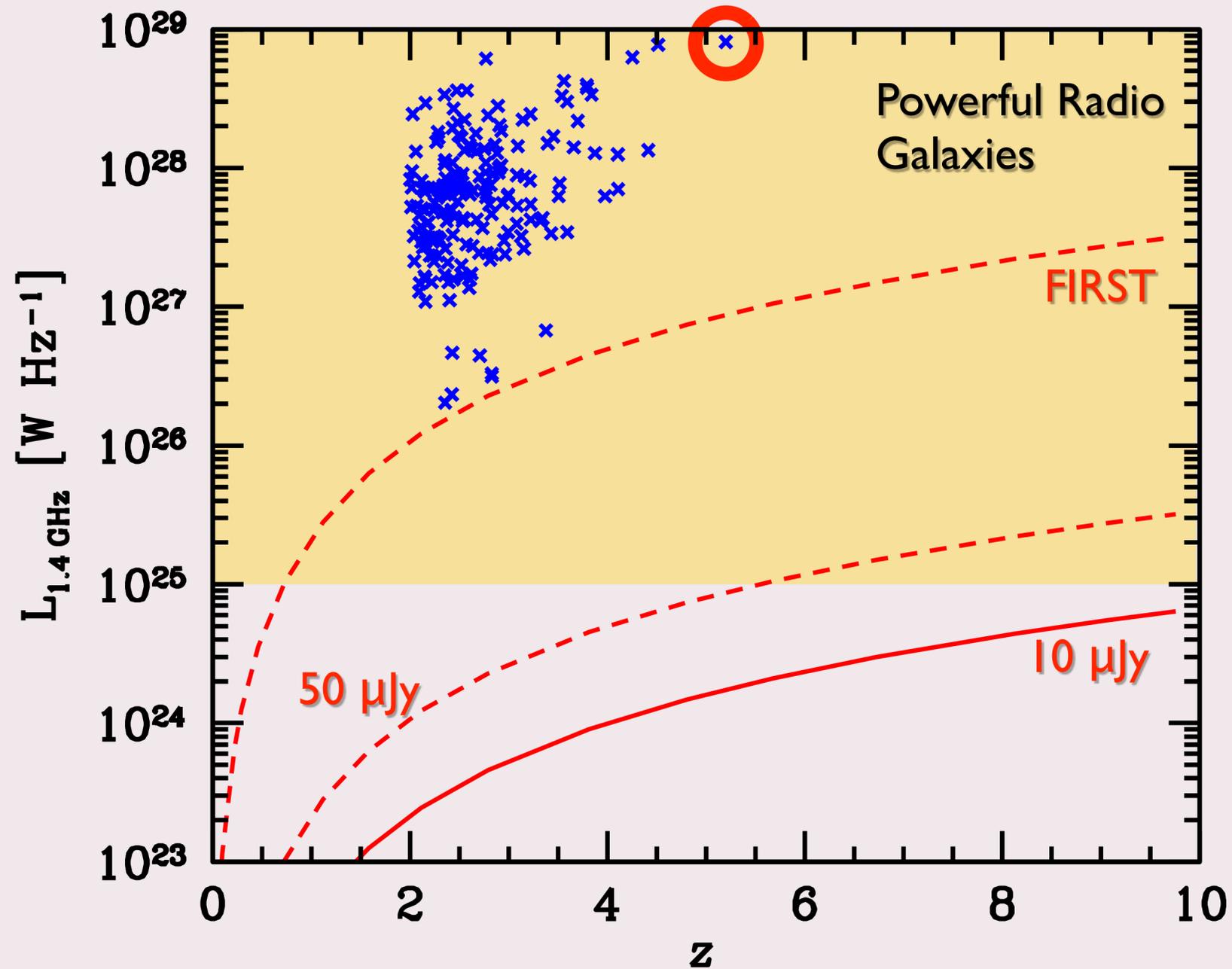
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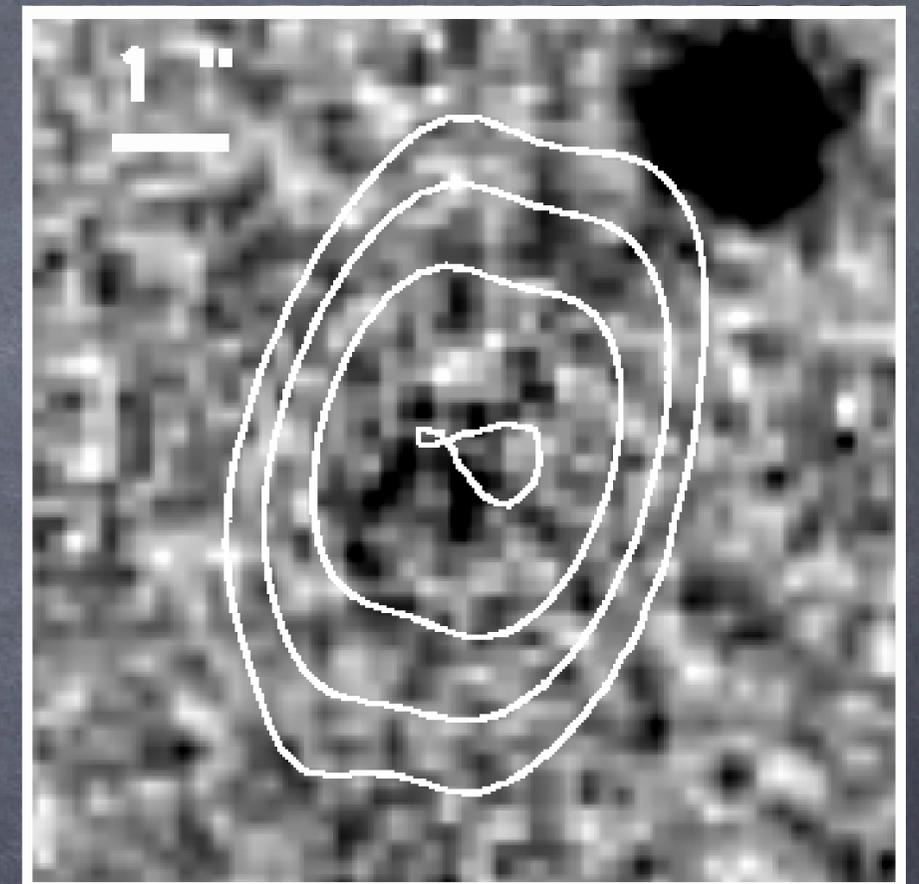
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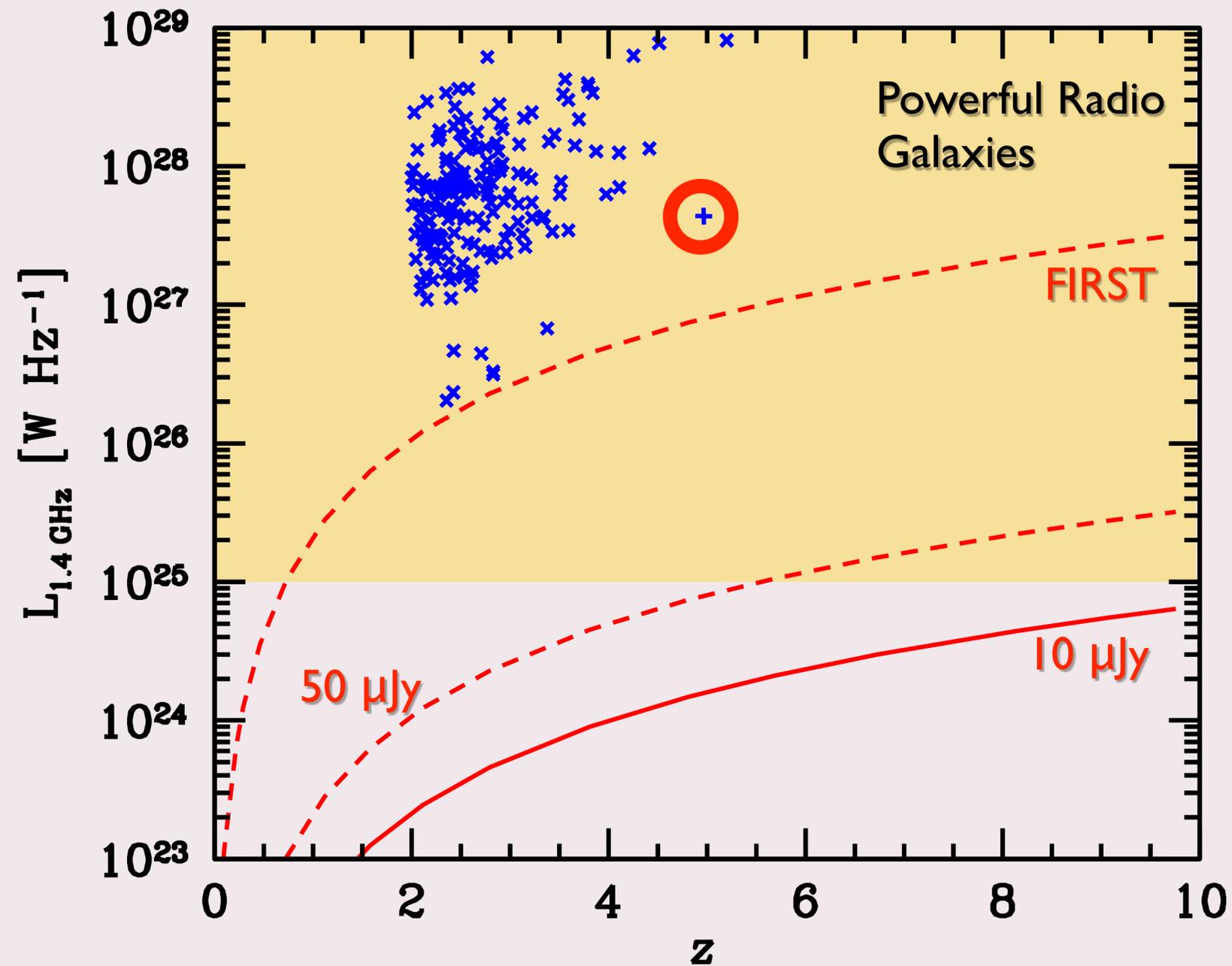


TN J0924-2201 @  $z=5.2$   
(van Breugel+, 99)

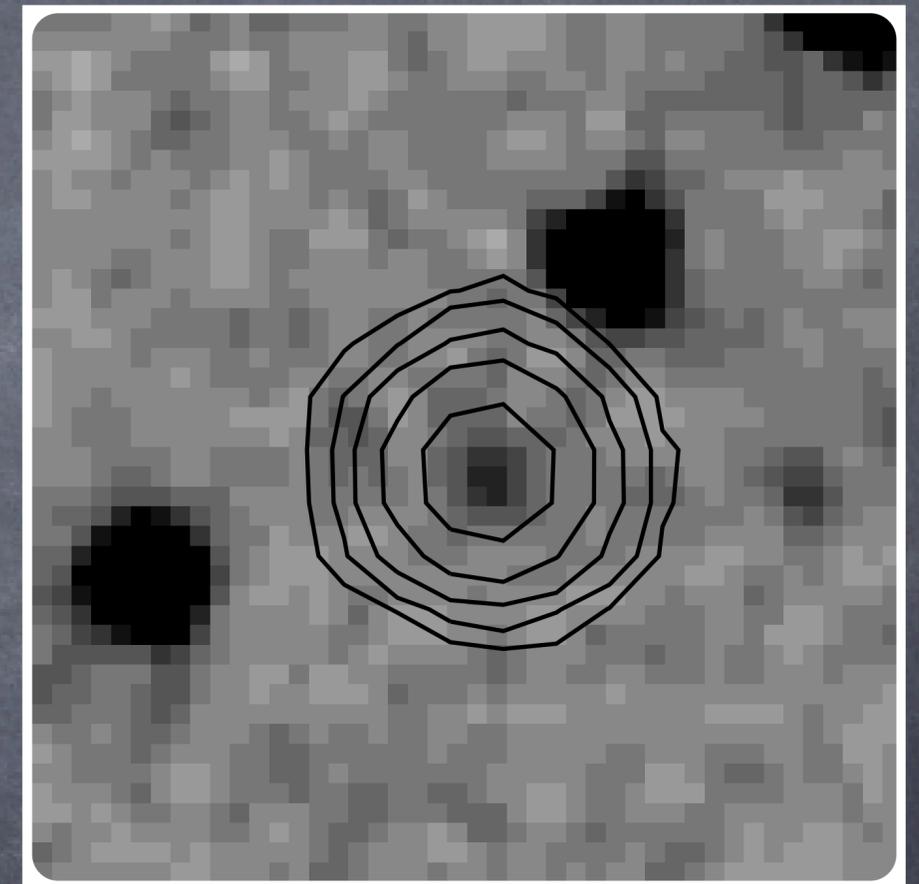


$S_{1.4\text{GHz}}=73 \text{ mJy}$

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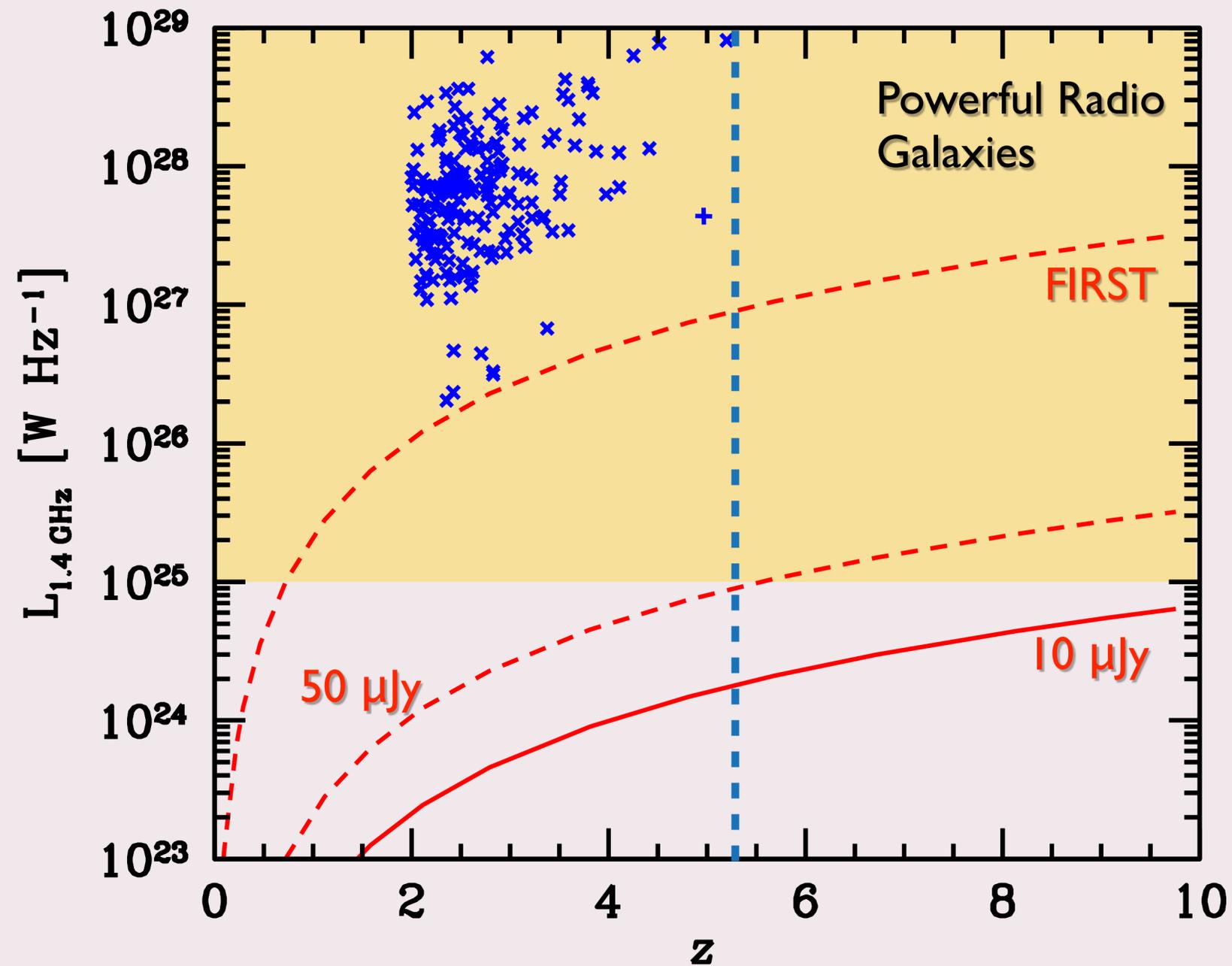


J163912.11 + 405236.5 @  $z=4.9$   
(Jarvis+, 09)

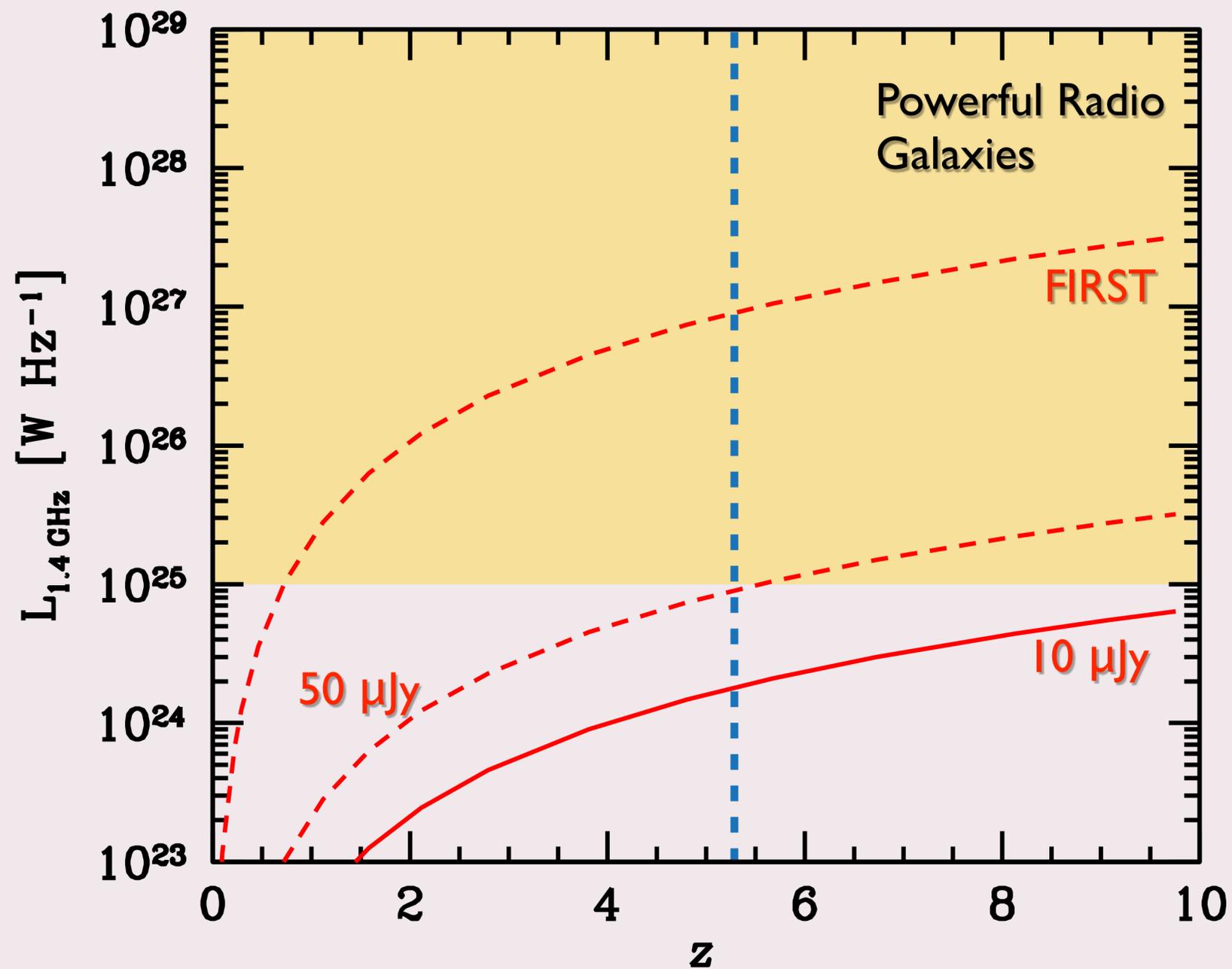


$S_{1.4\text{ GHz}} = 22 \text{ mJy}$

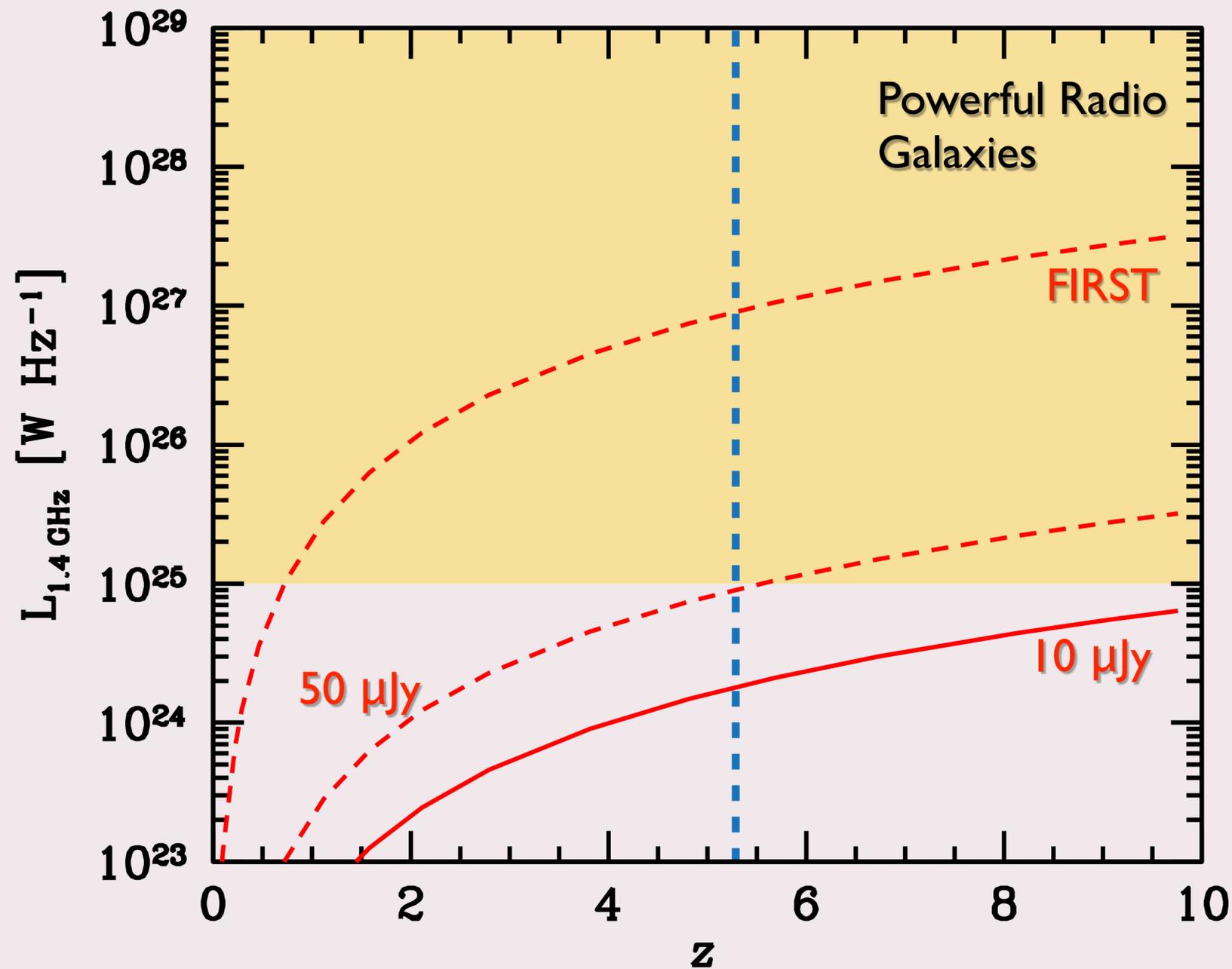
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# Do they even exist?

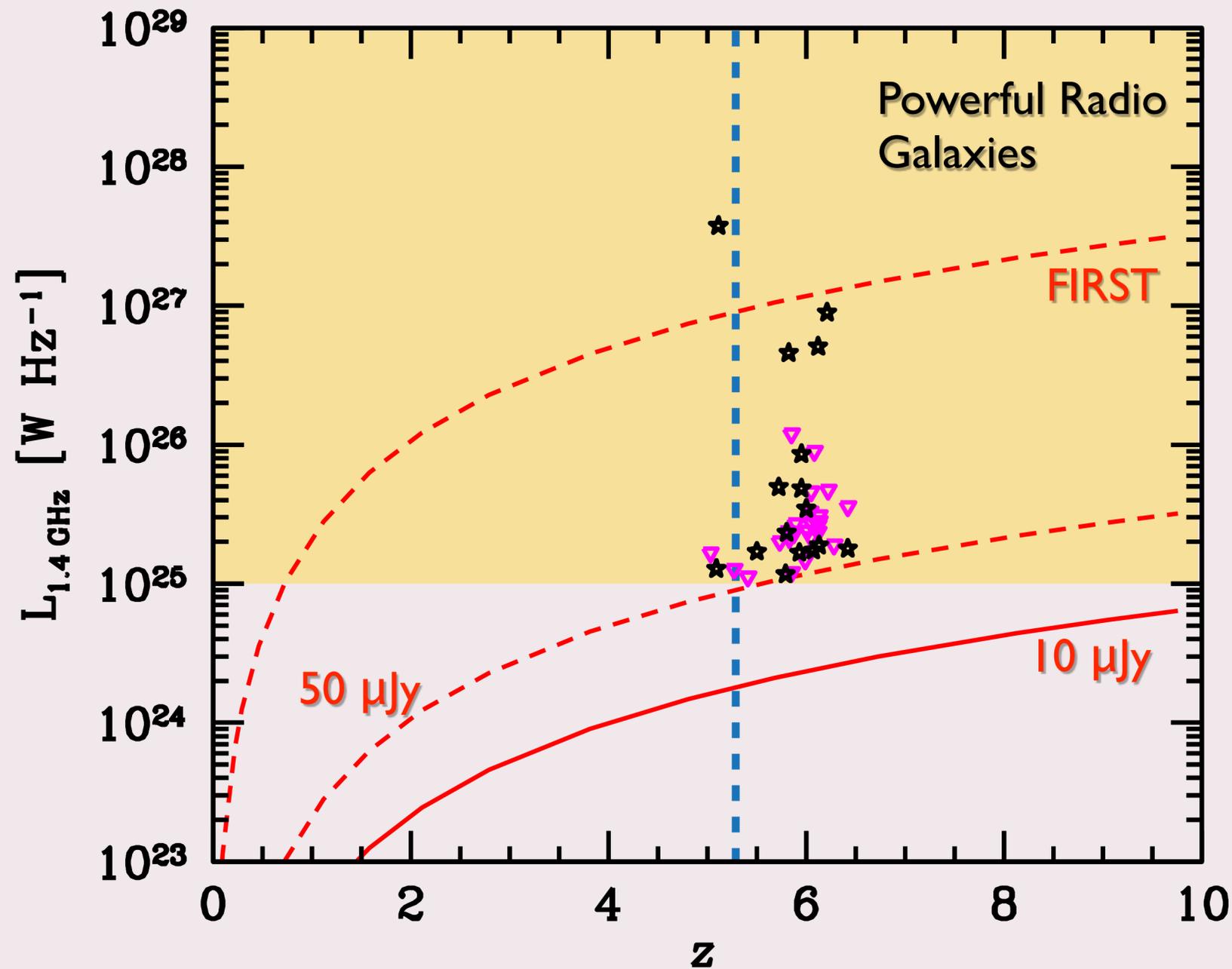


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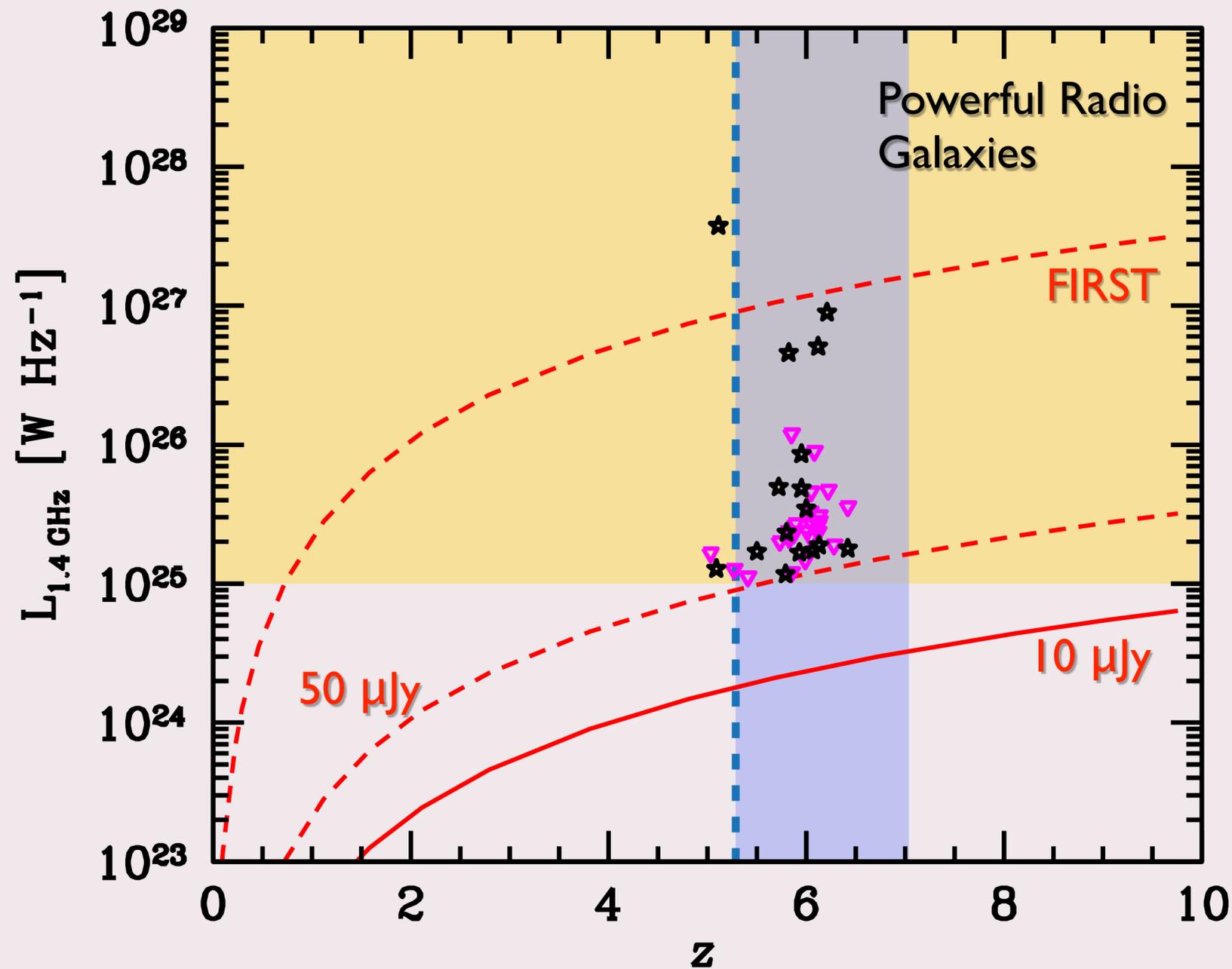
Observations of high- $z$  AGN:  
- Highest  $z$  QSO from UKIDSS ( $z=7.09$ , Mortlock+, II)  
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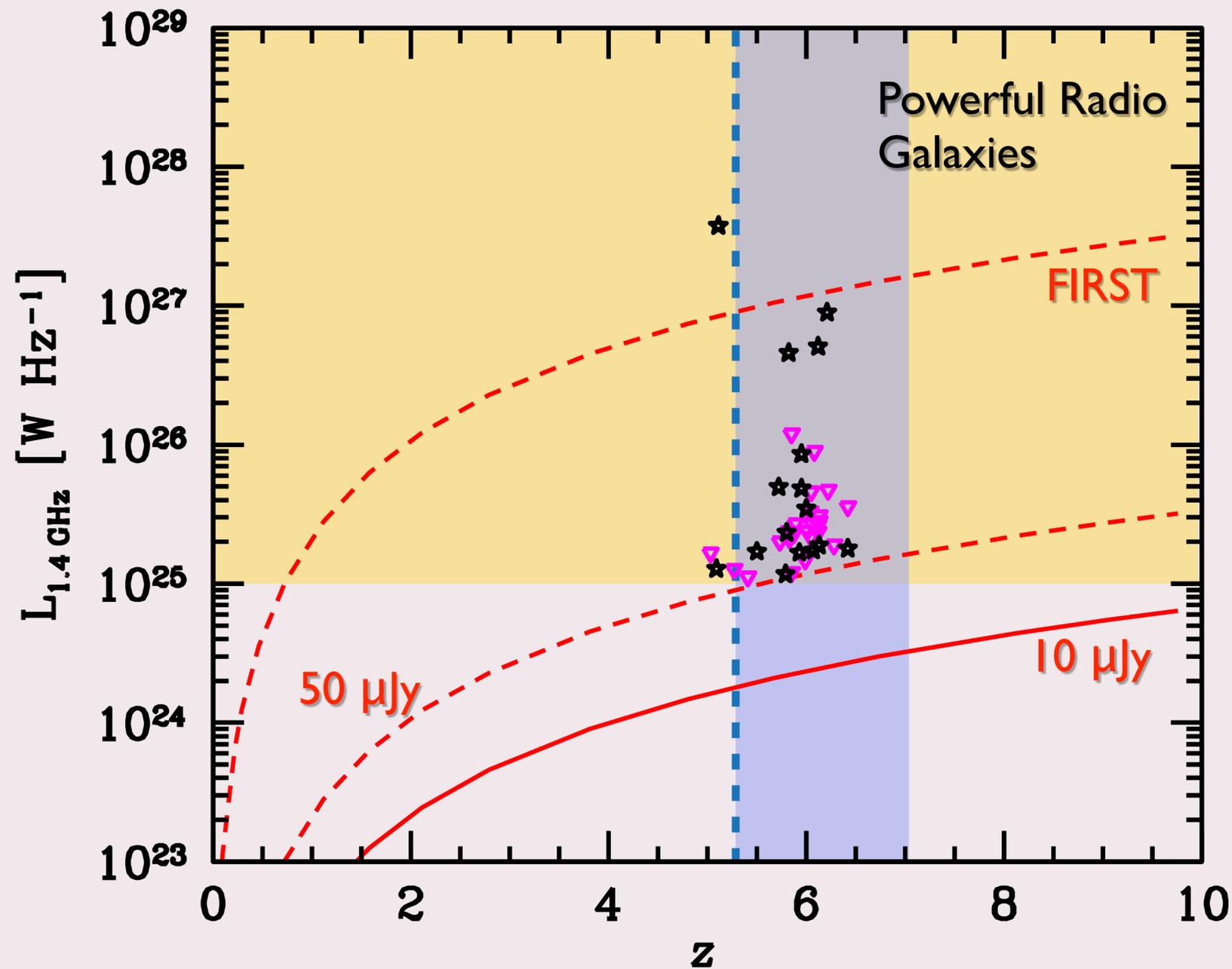


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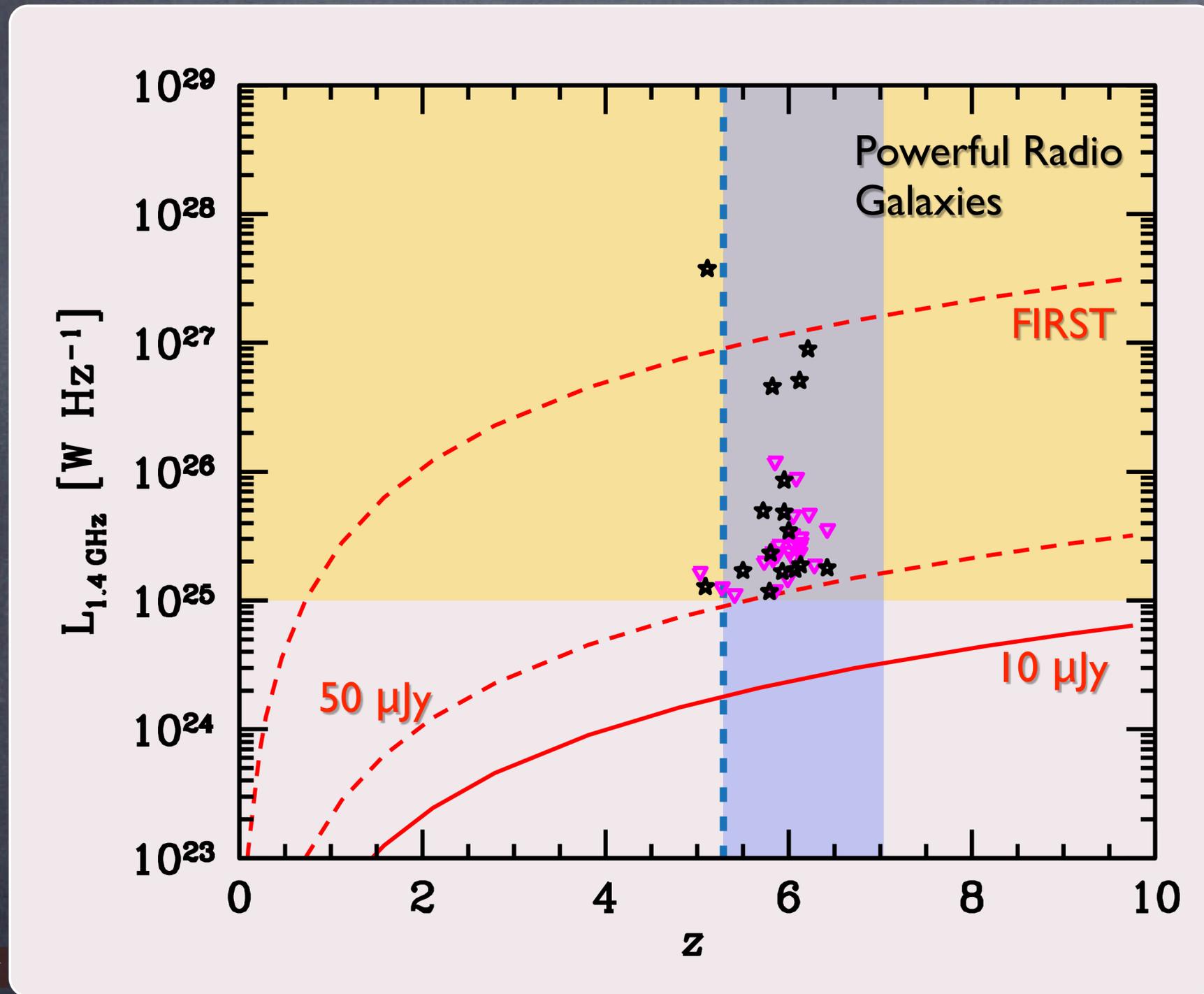
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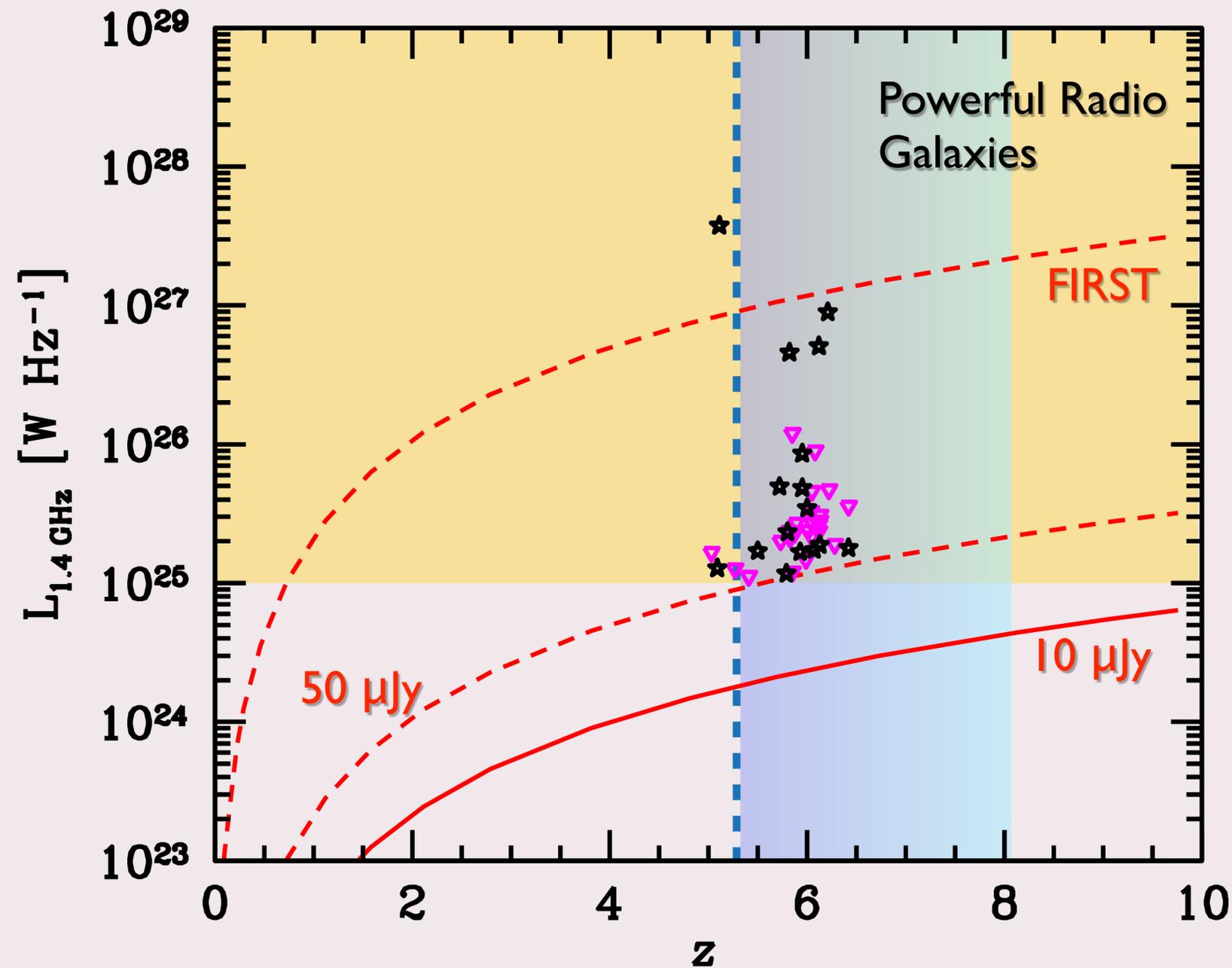
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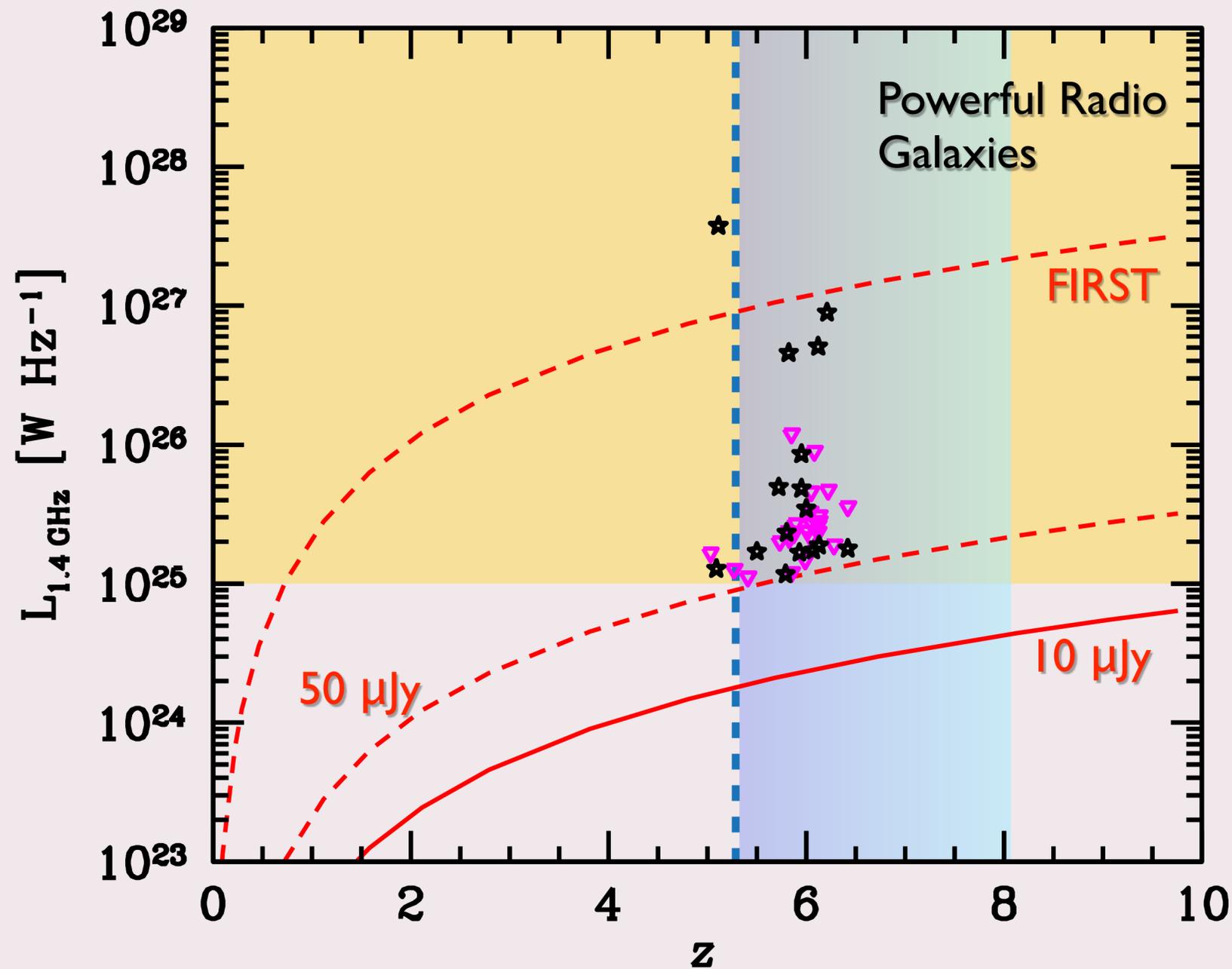


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Large pop of SMBHs at  $z \sim 8$   
possible, depending on initial seeds  
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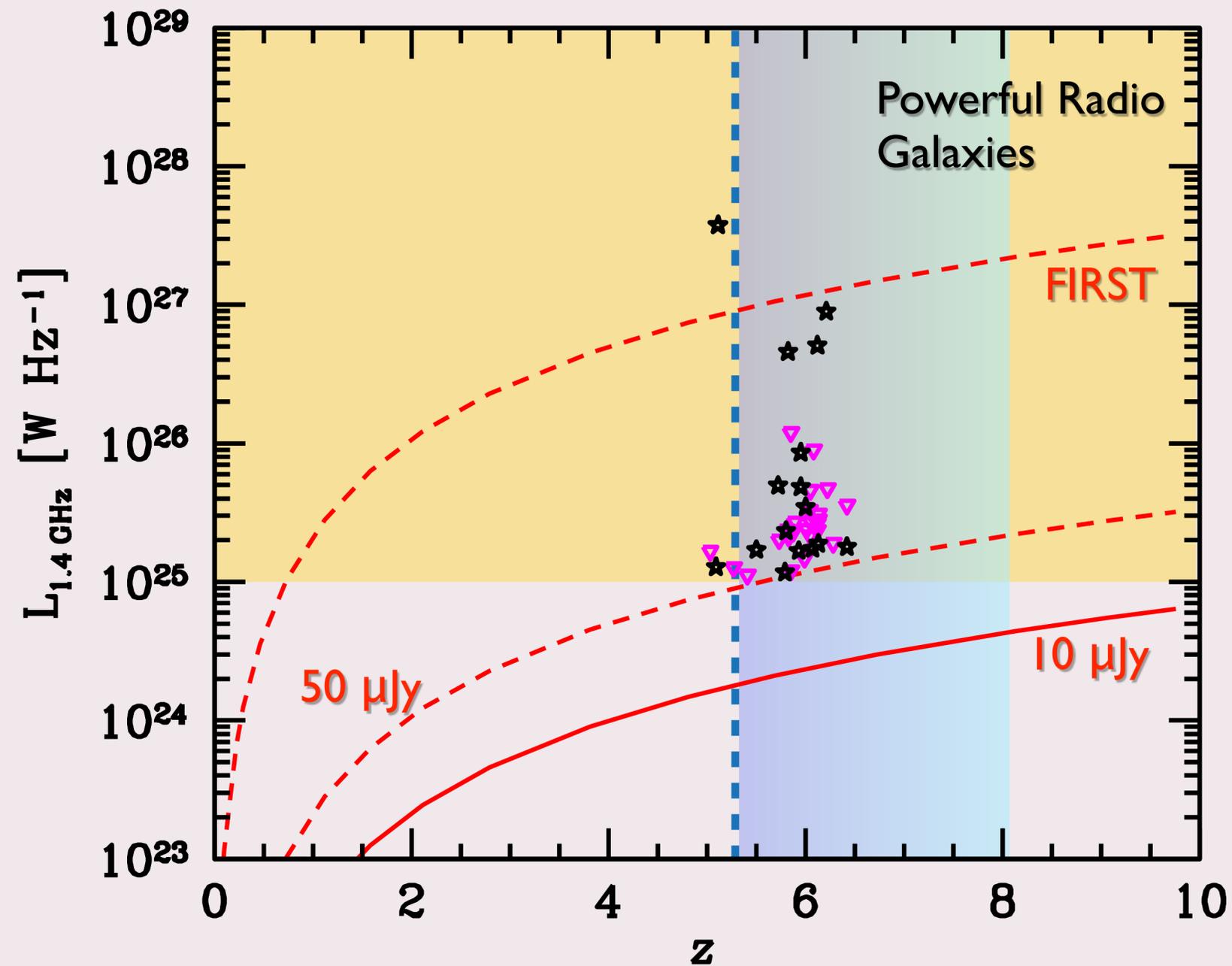
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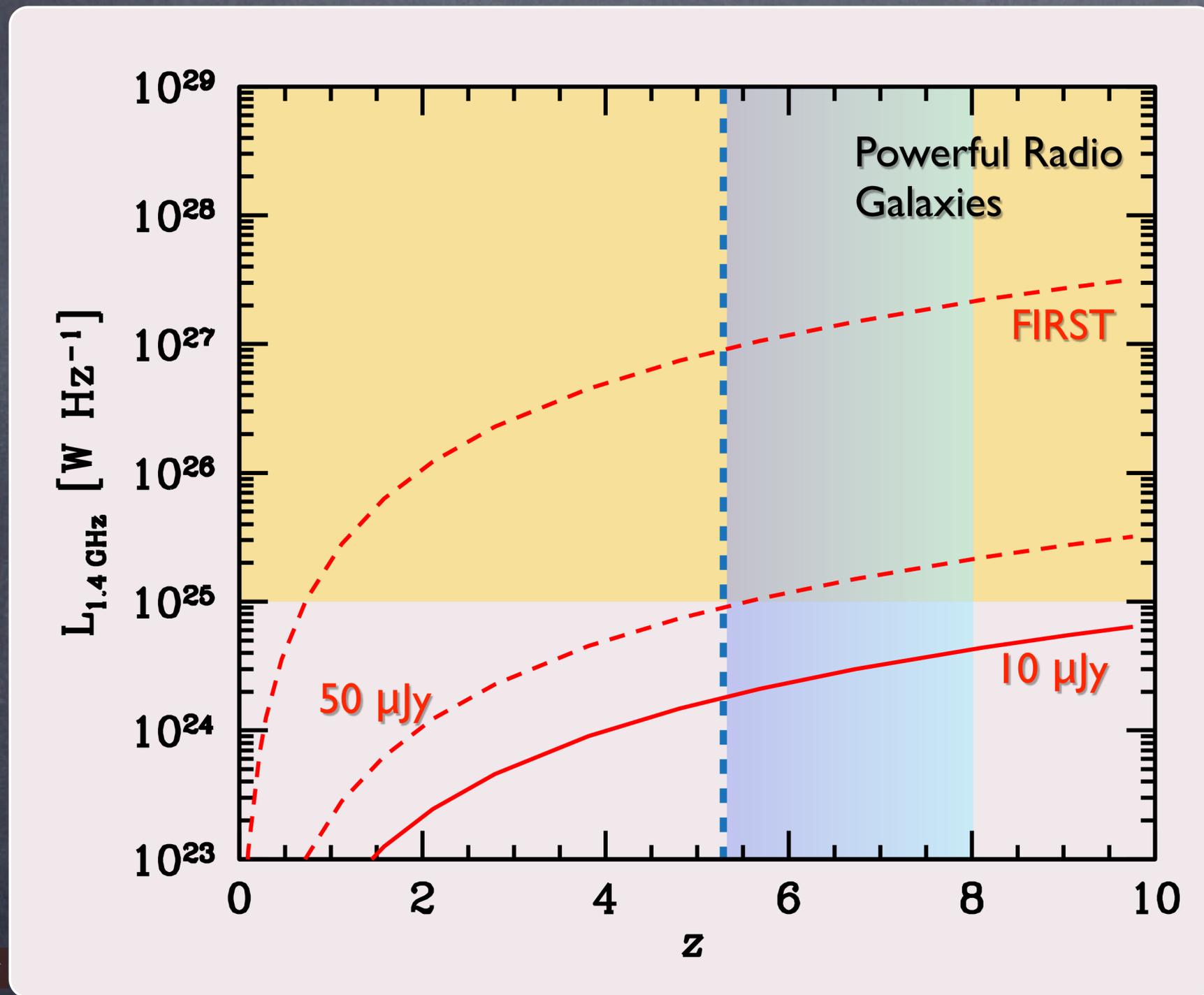
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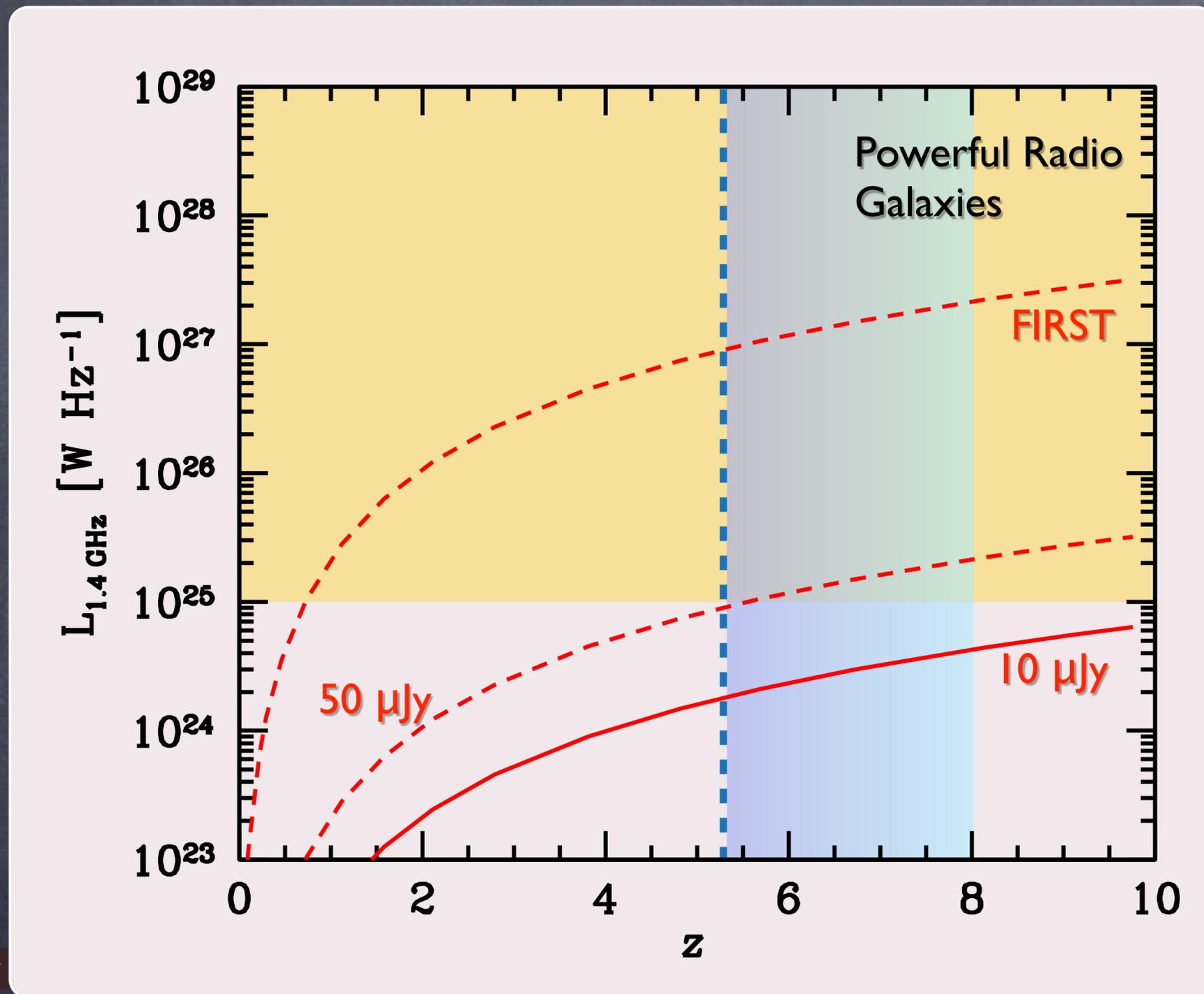


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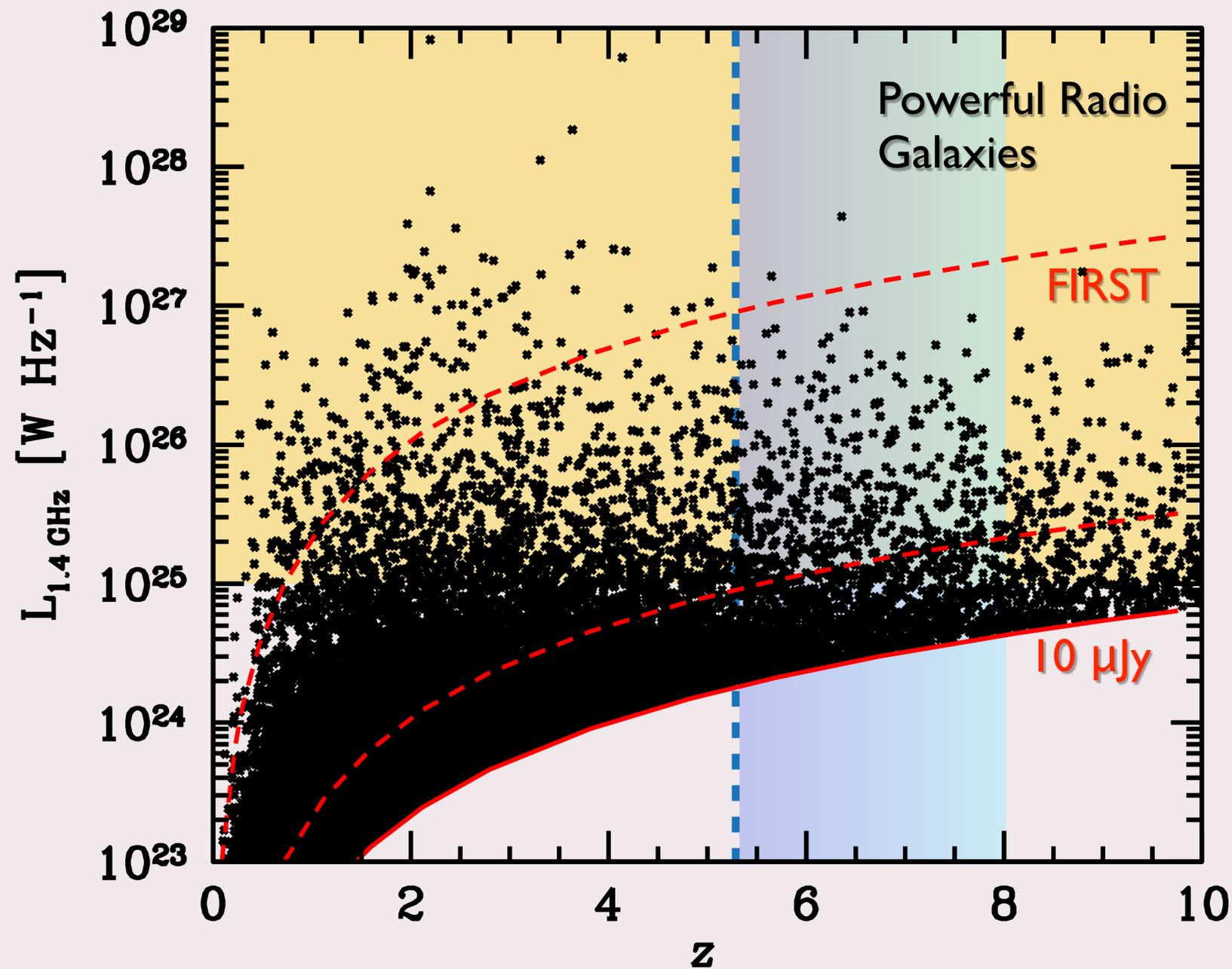
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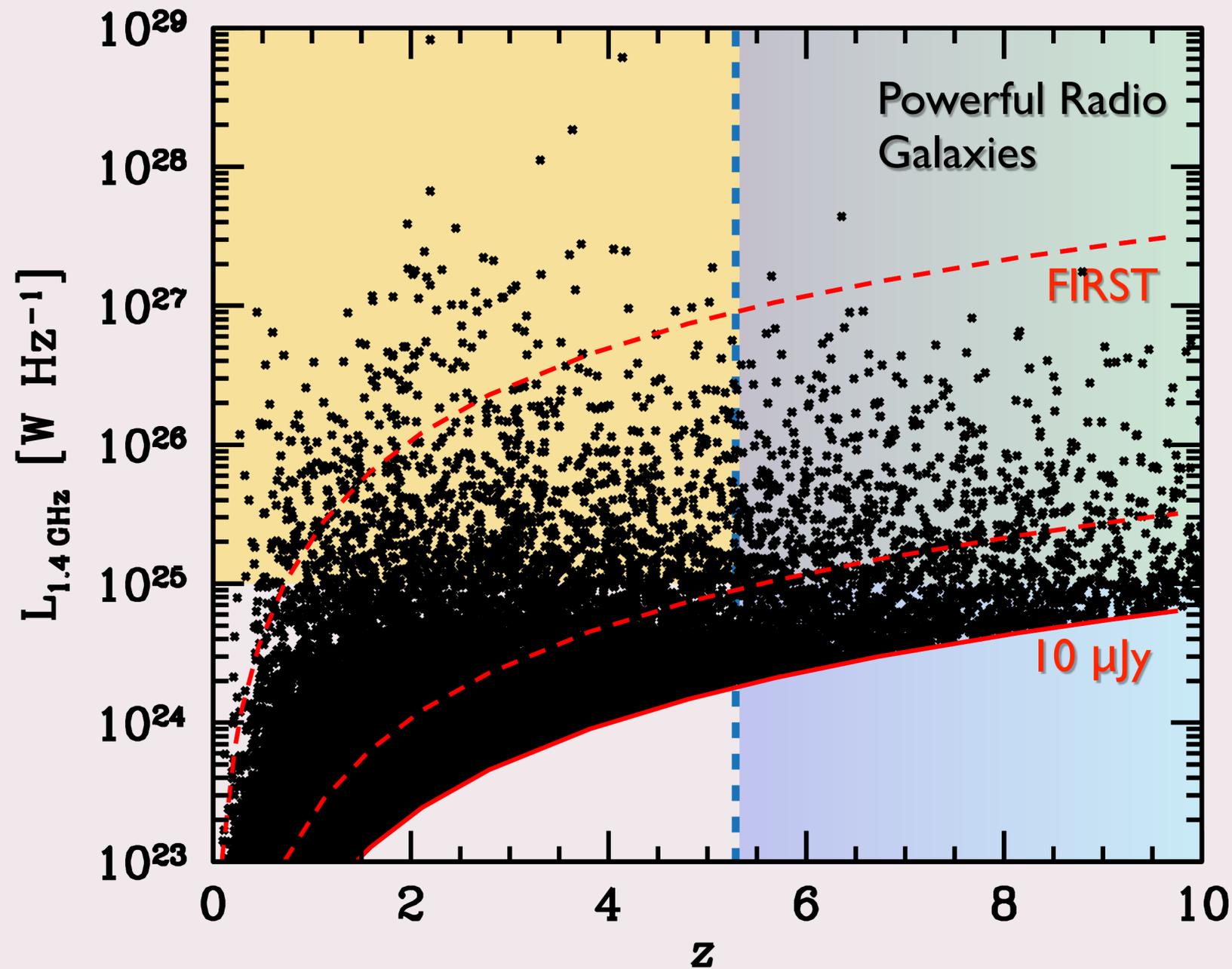
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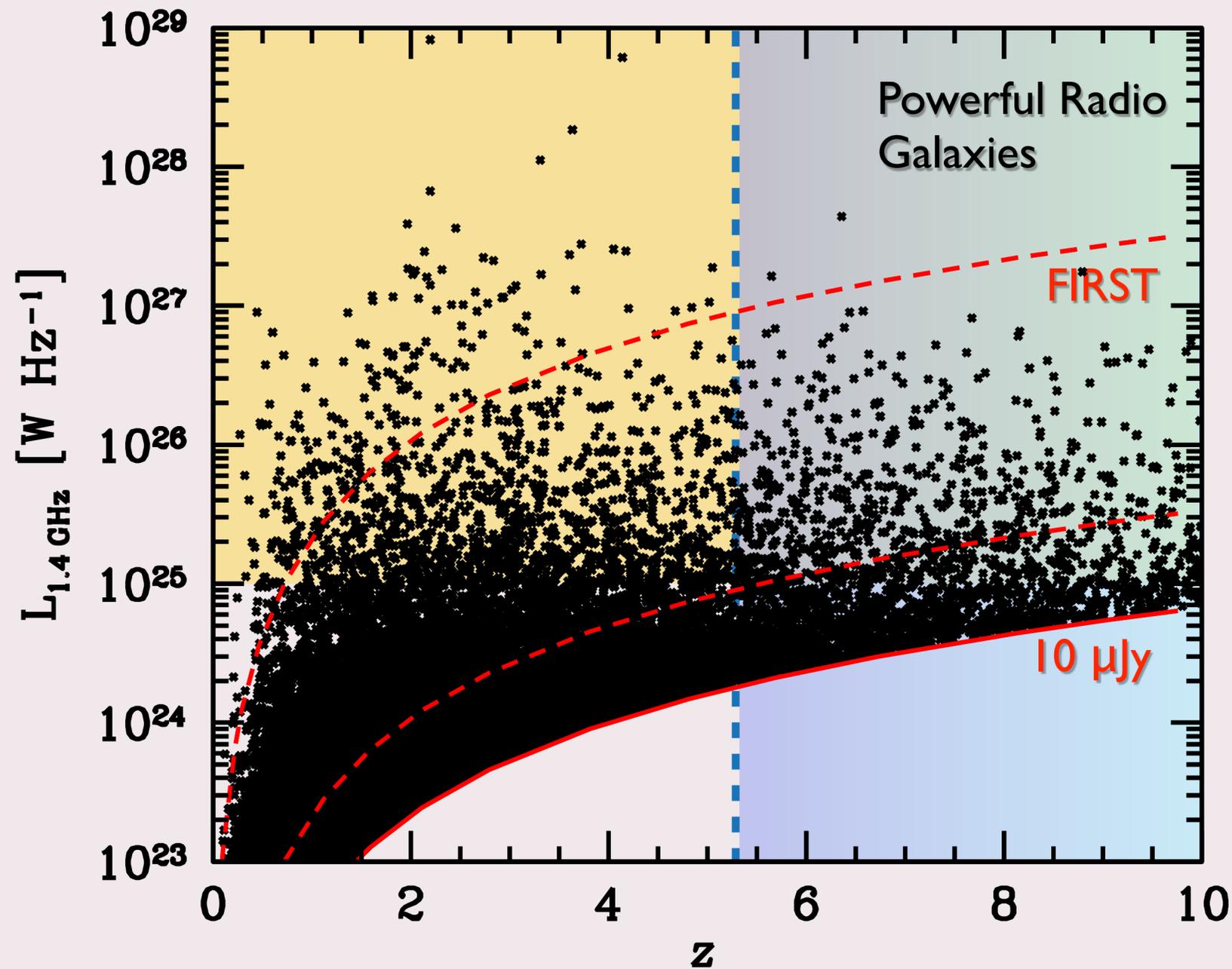
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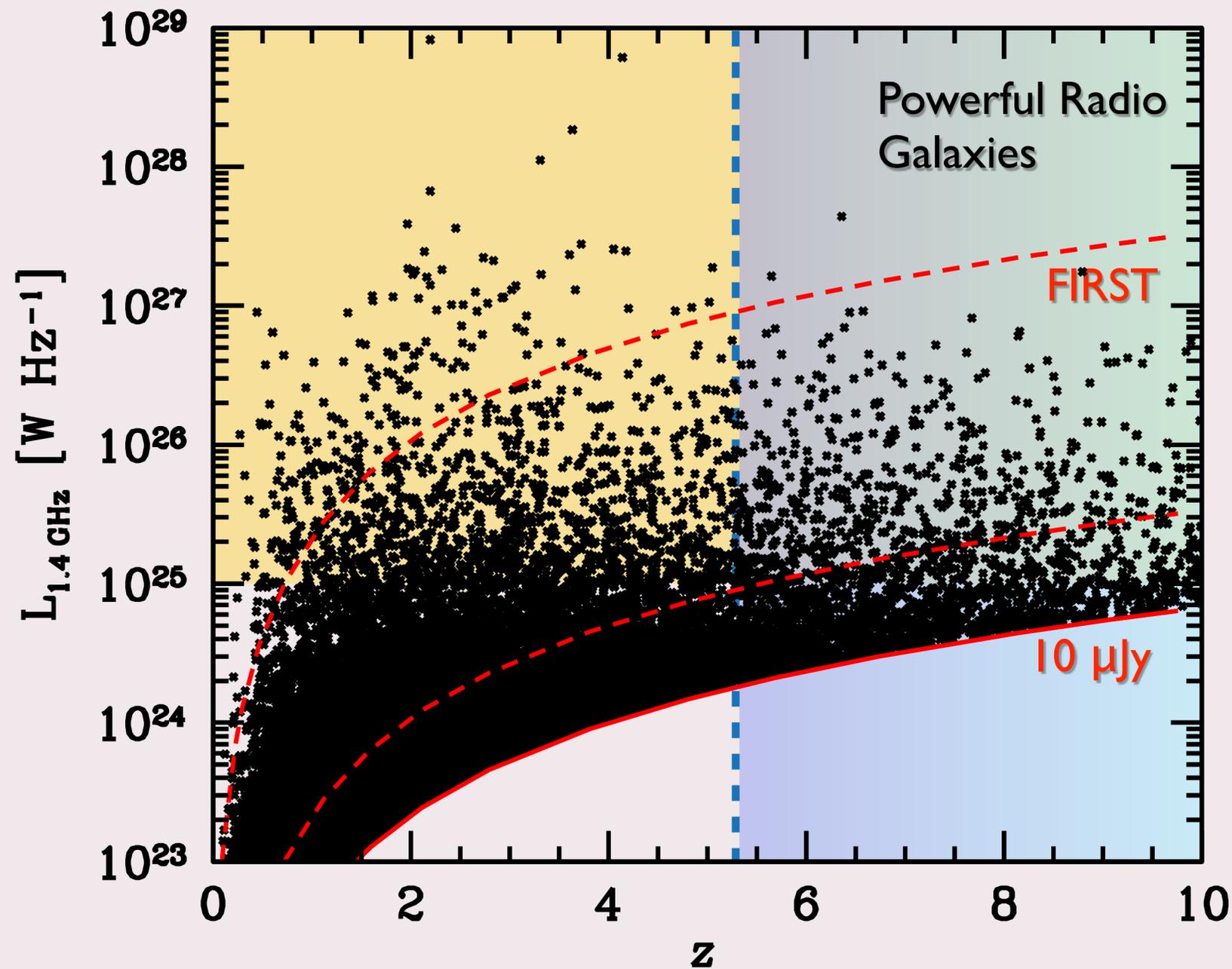


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The AGN process/physics at high- $z$ ?

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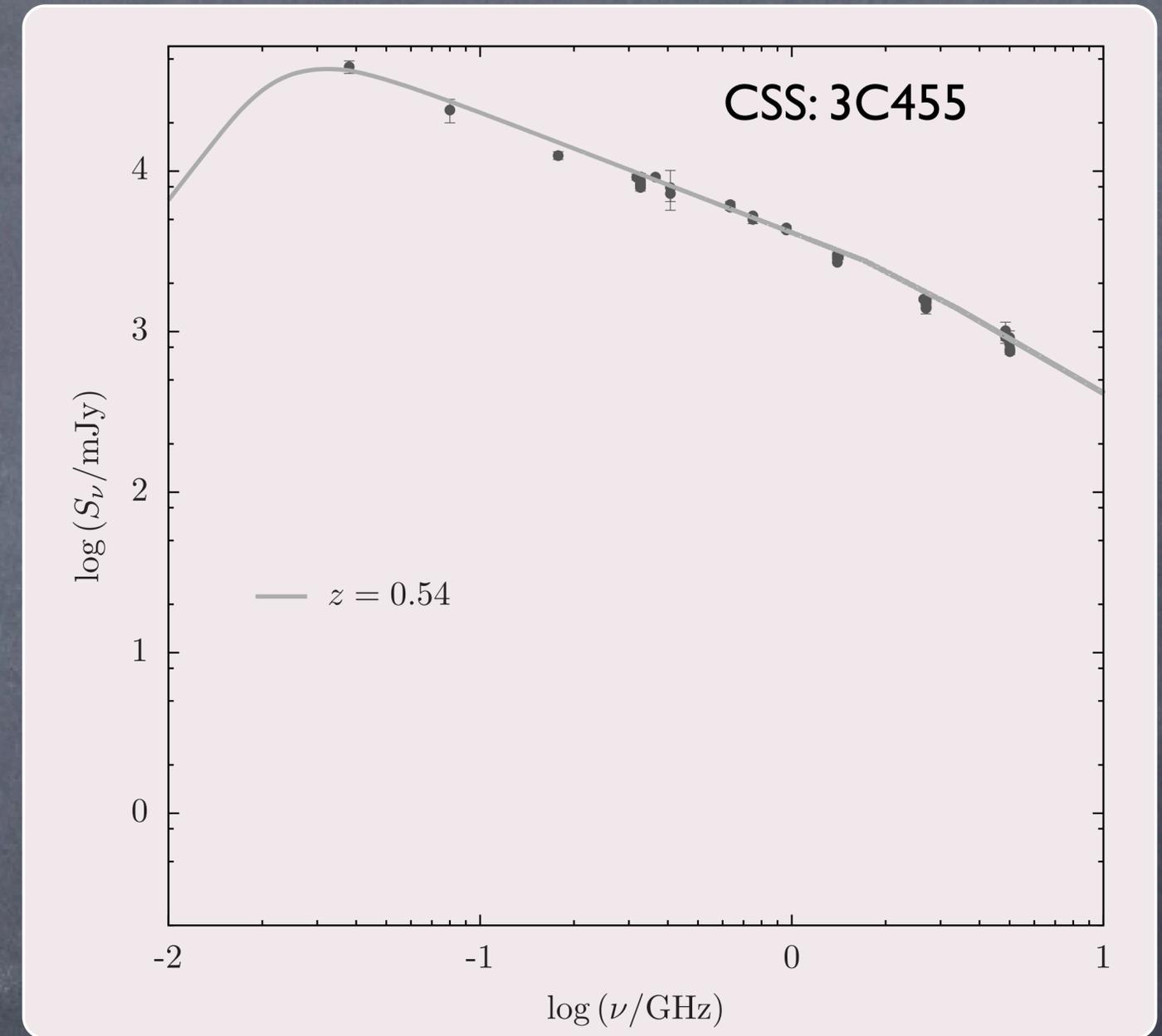
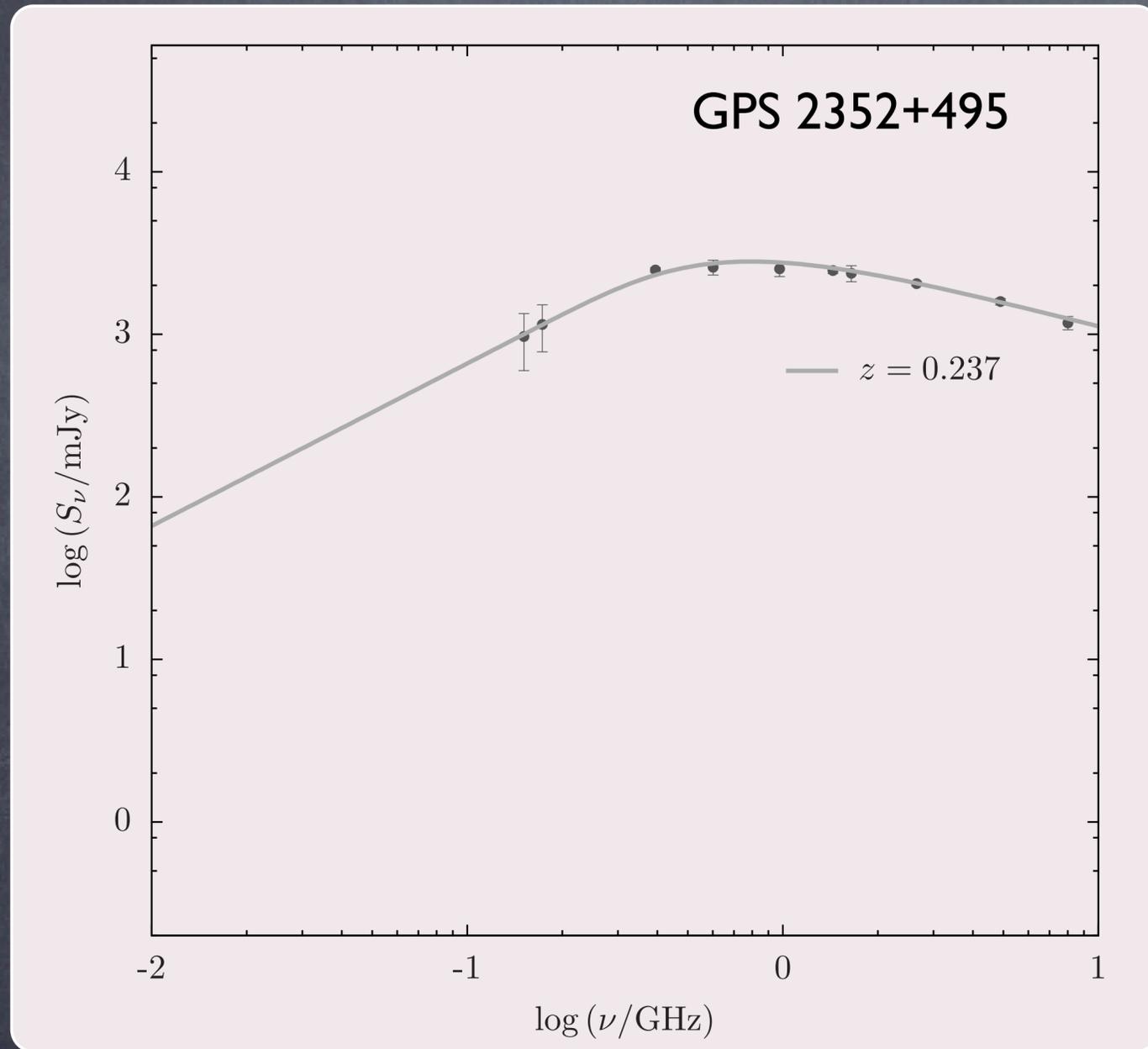
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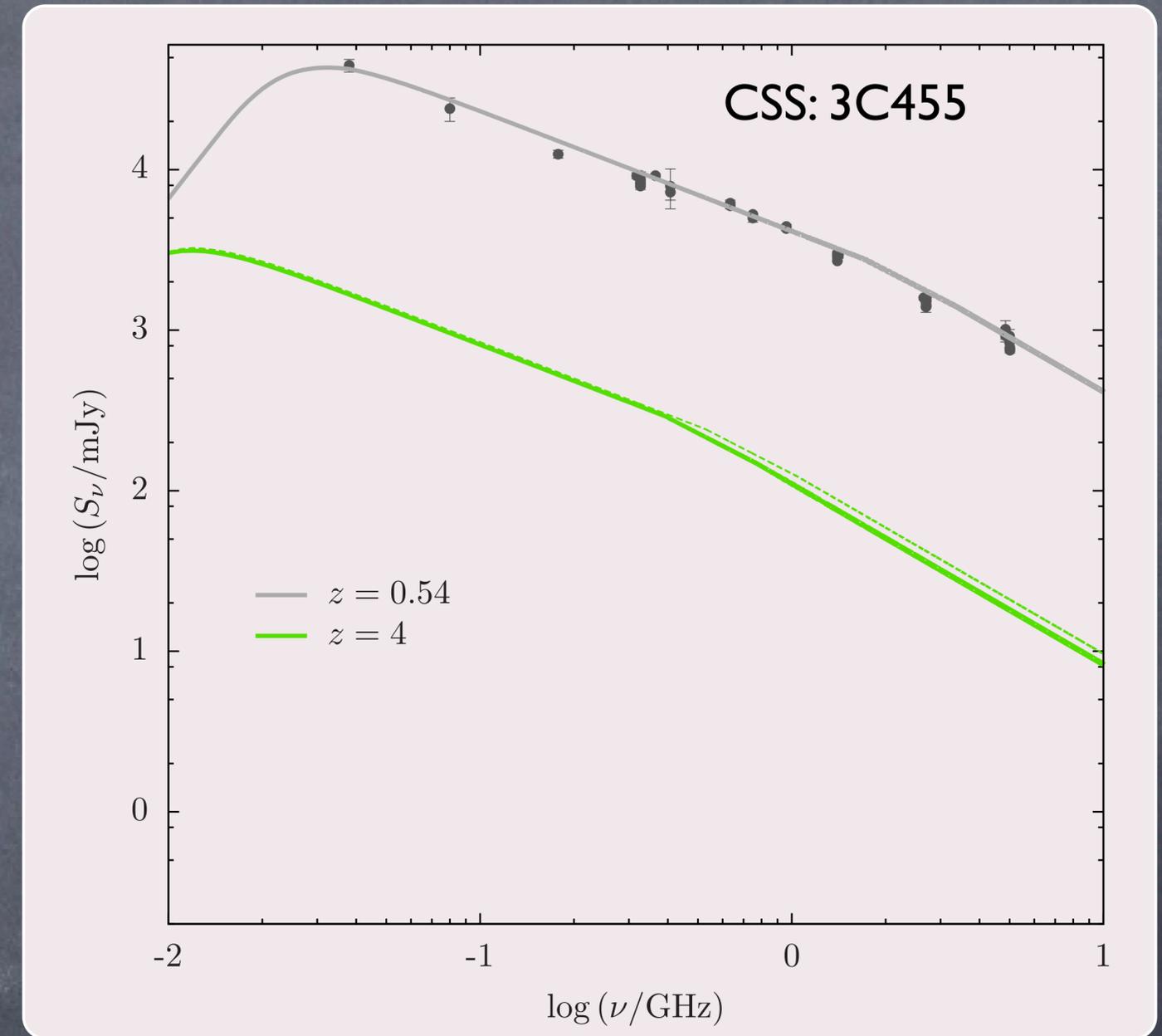
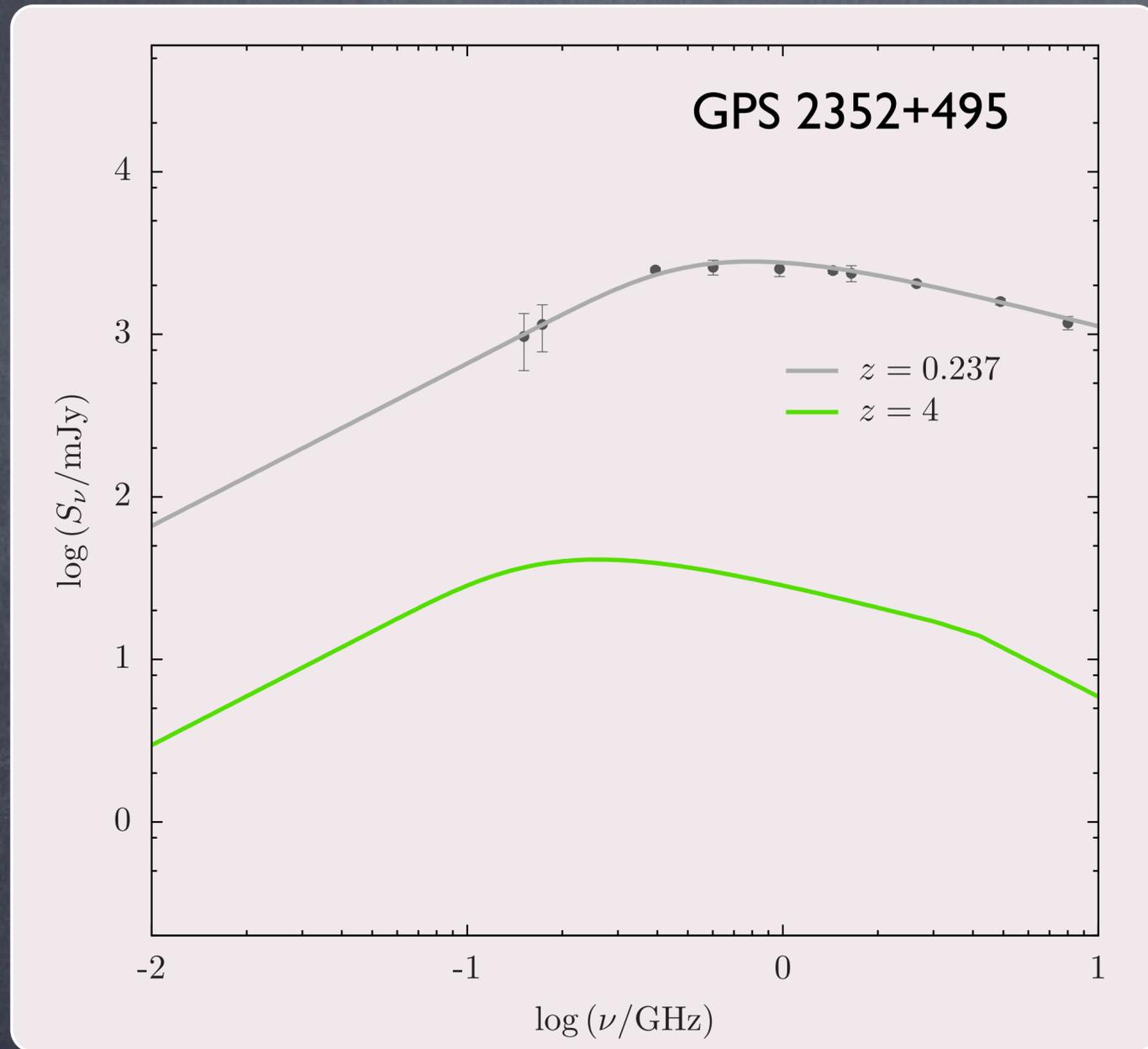
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Young/compact radio sources (GPS, CSS) unaffected ( $<4:1$  decrease)

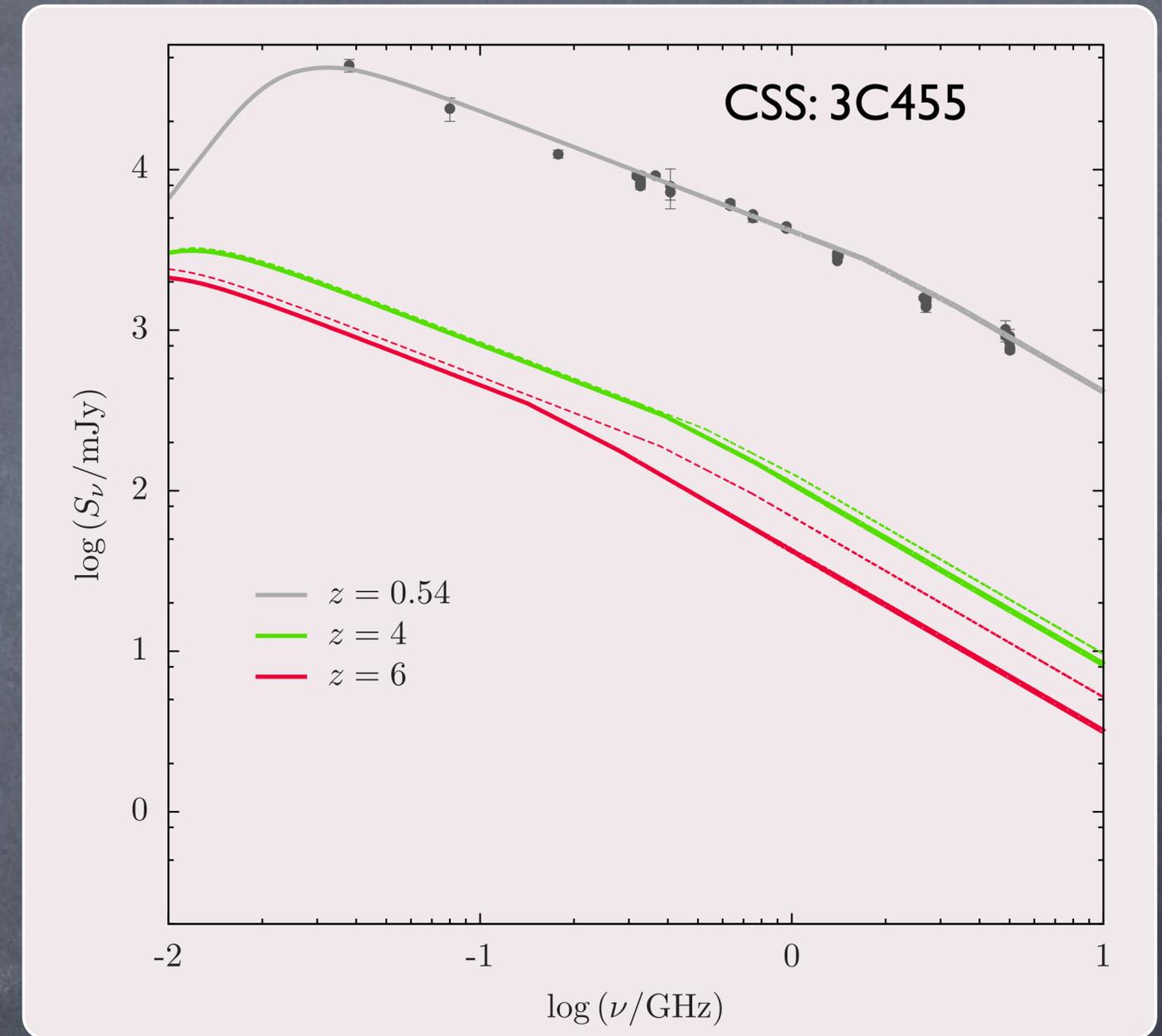
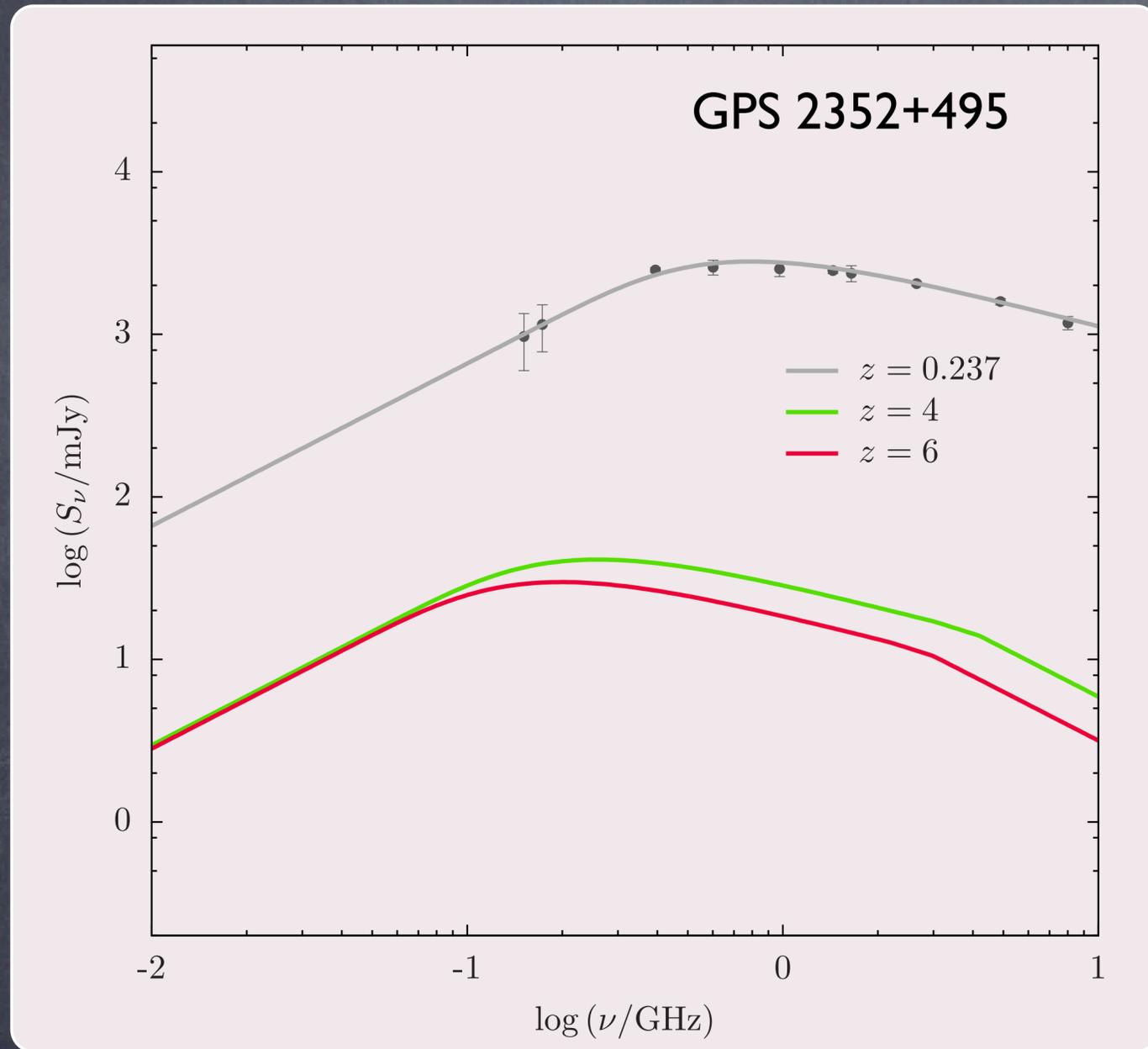
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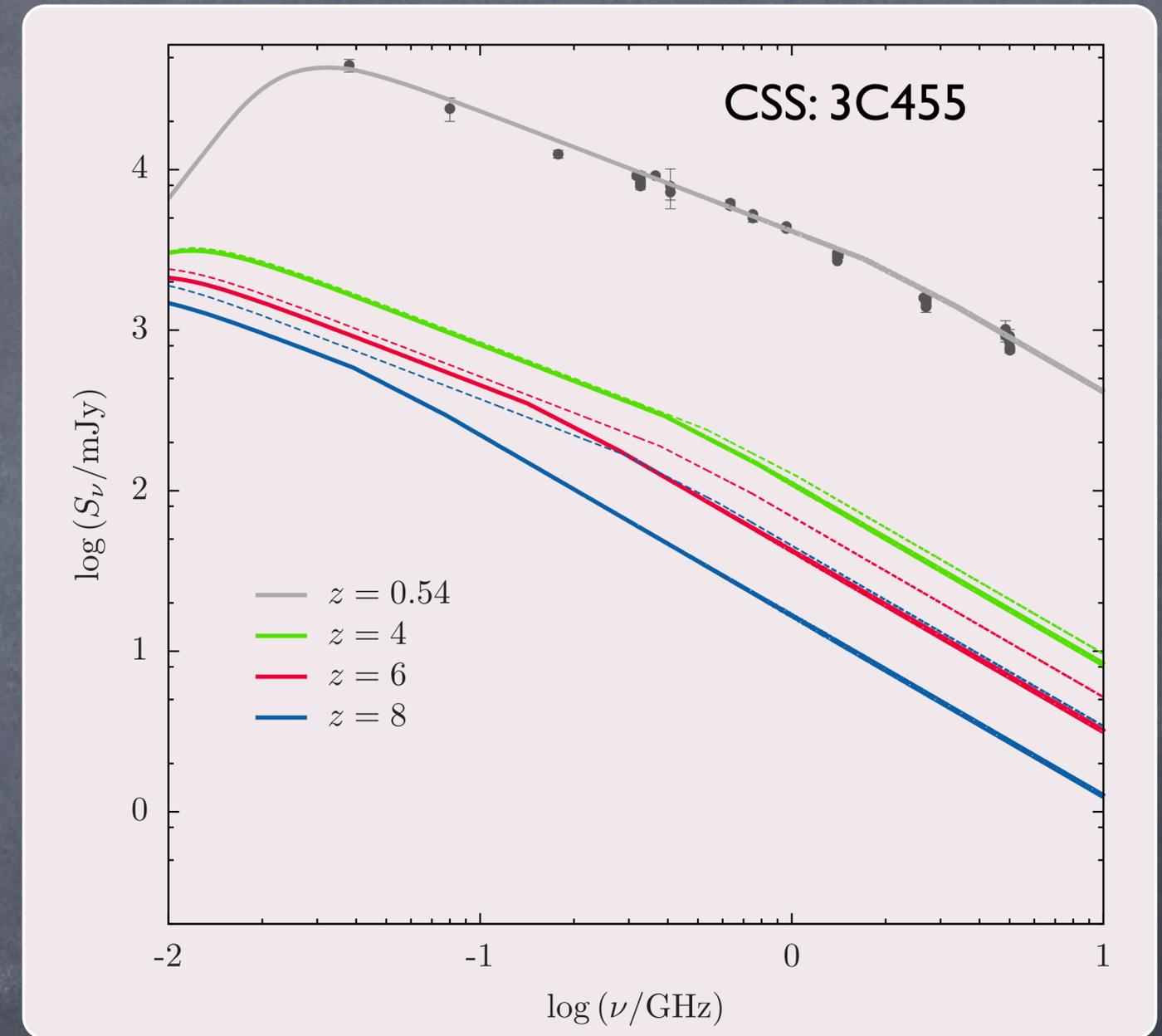
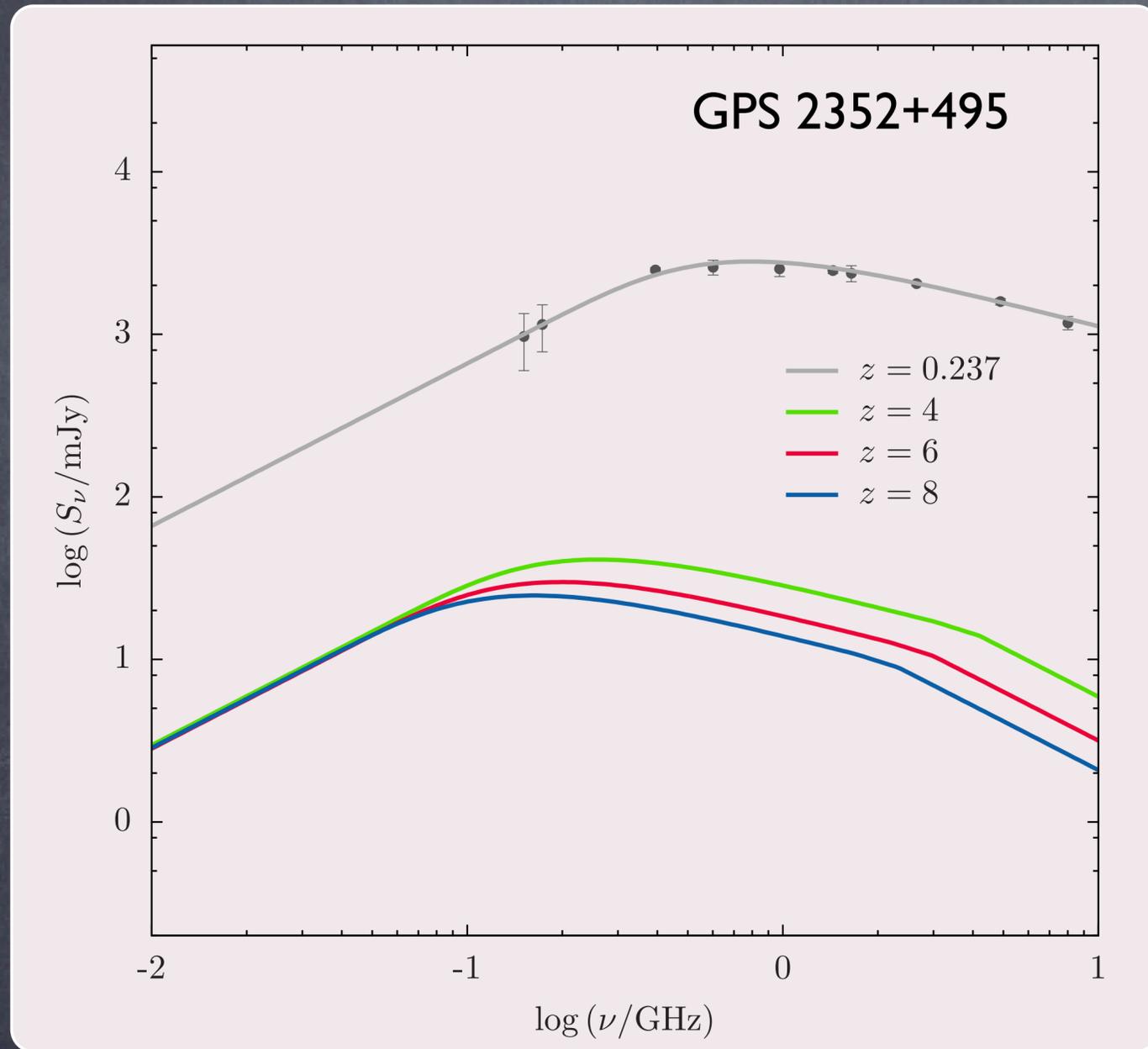
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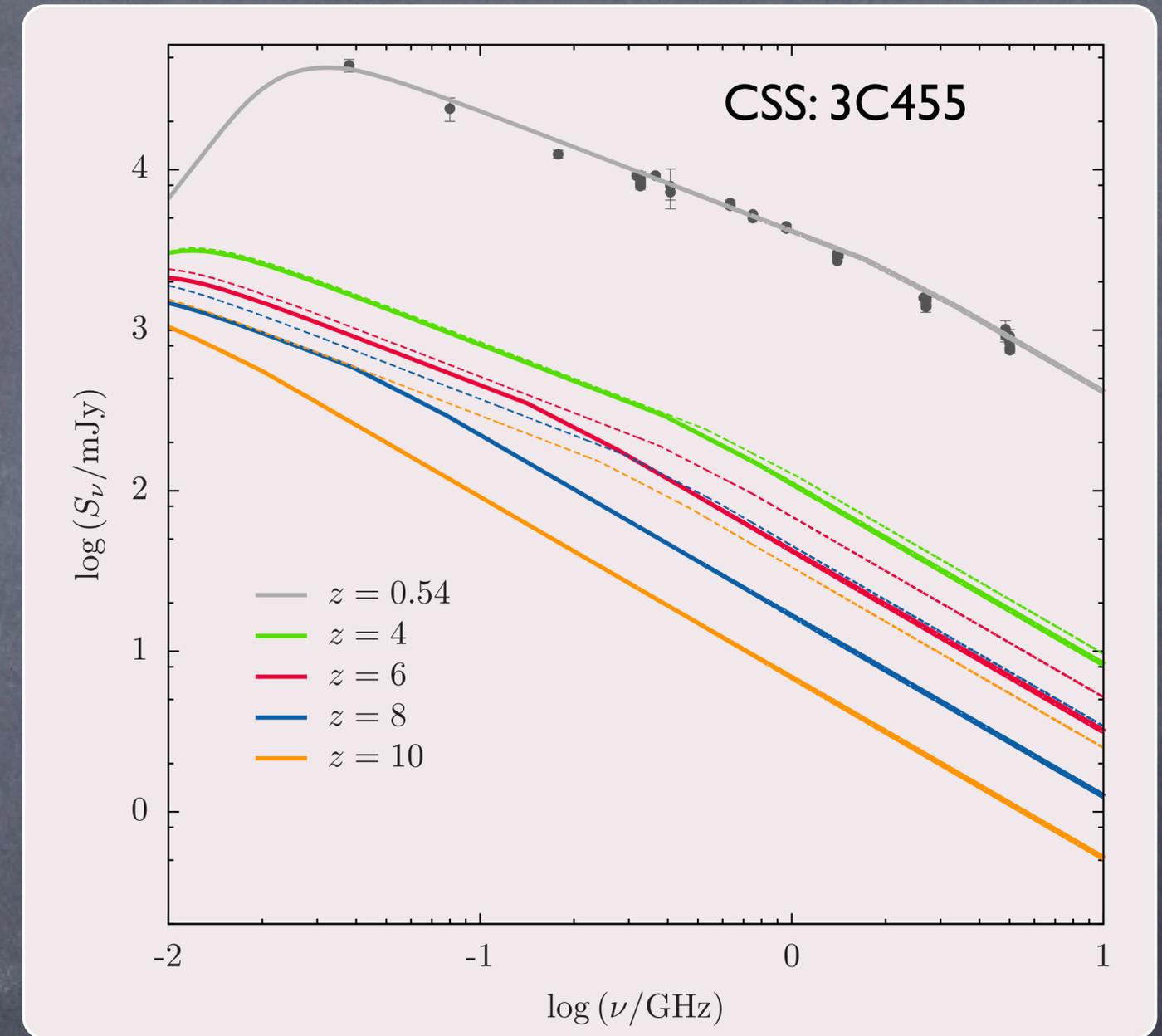
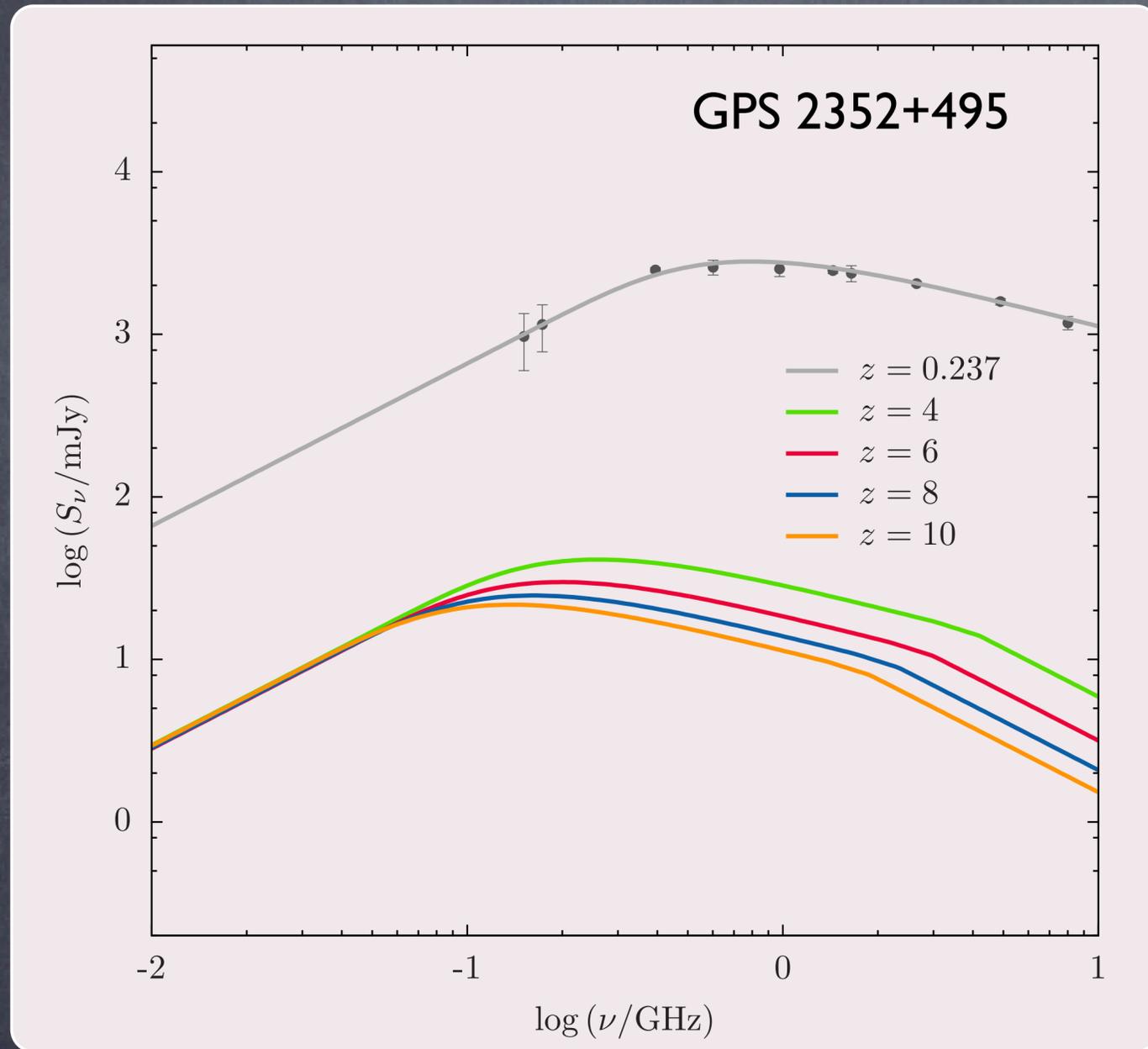
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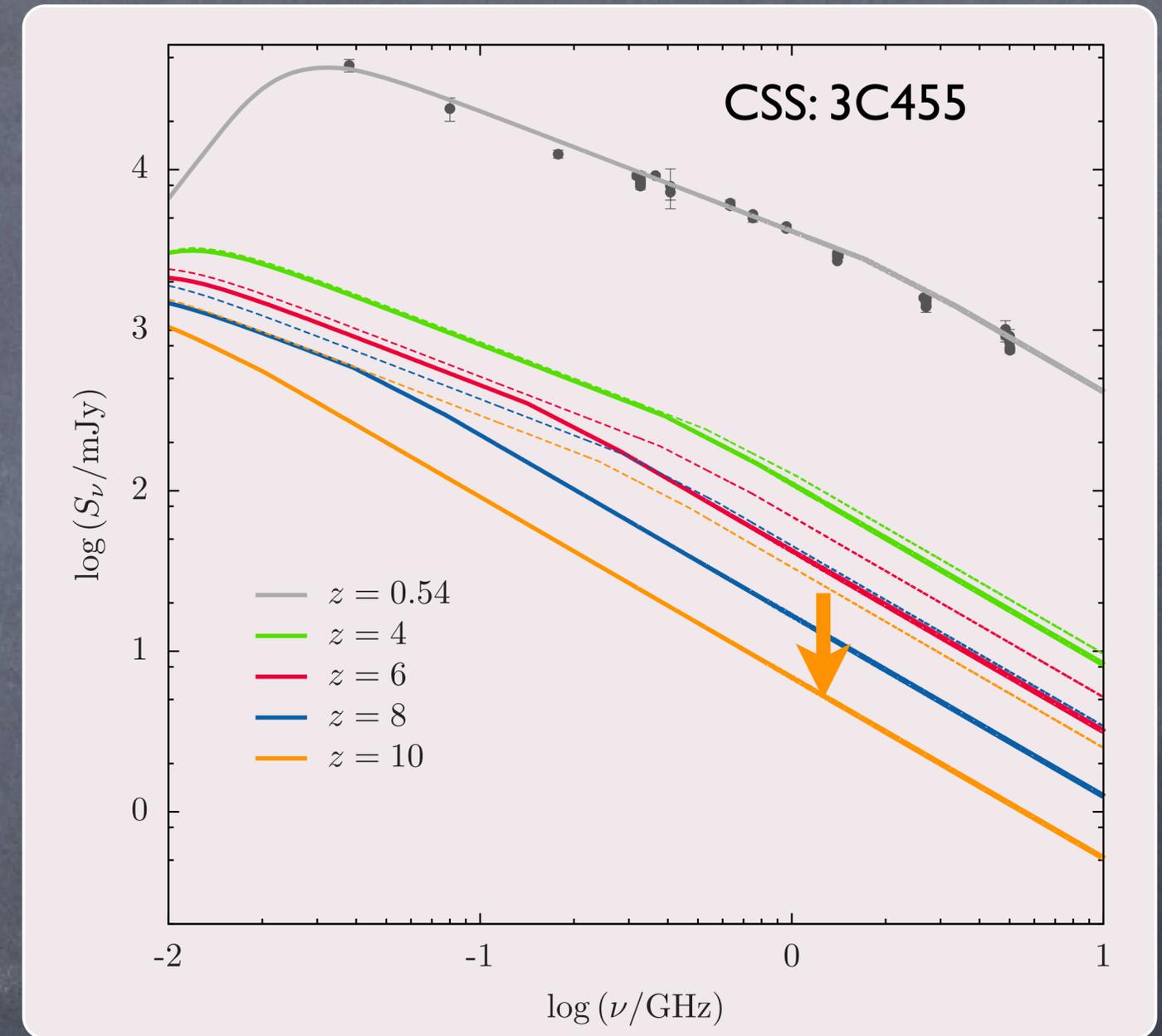
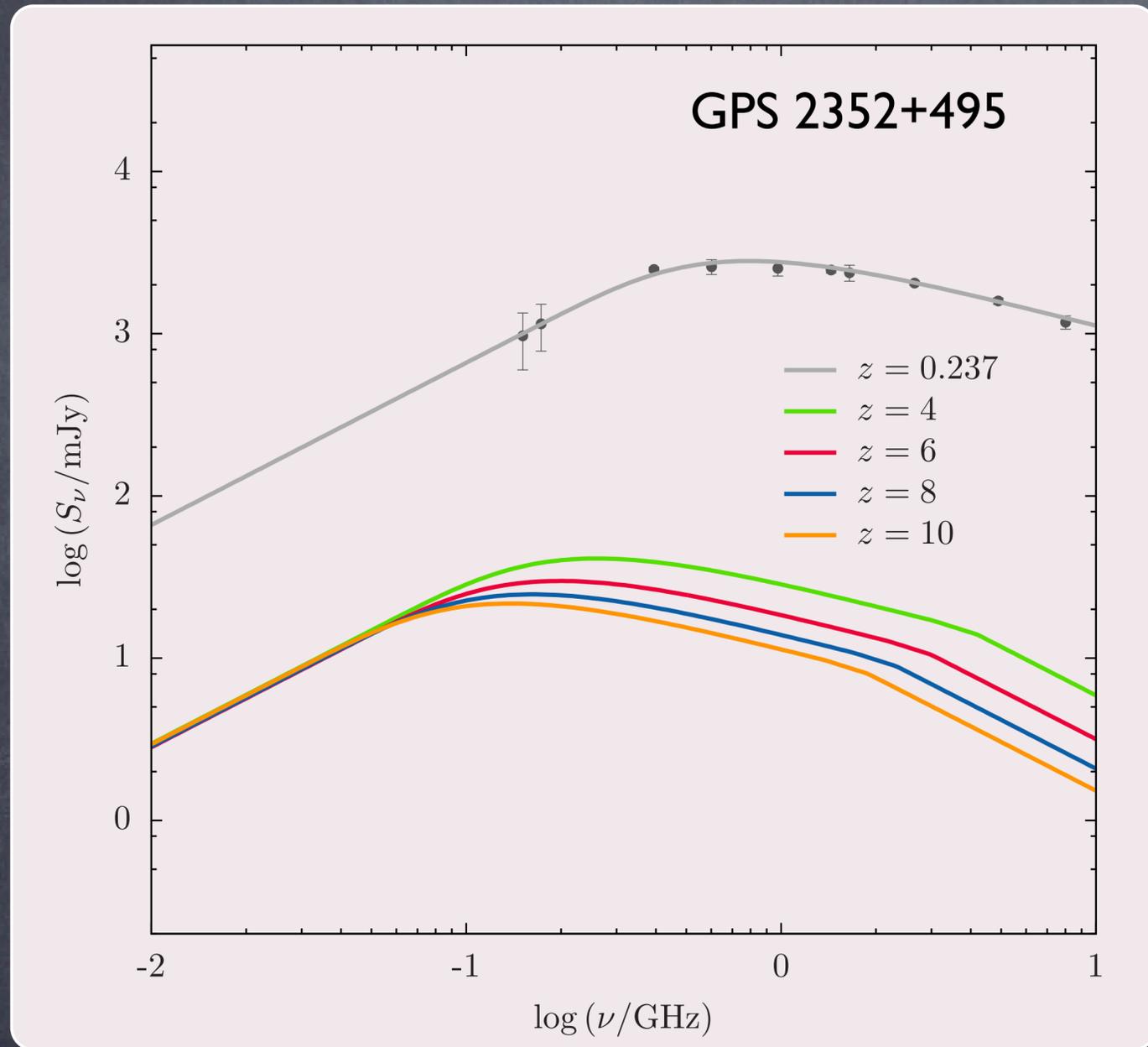
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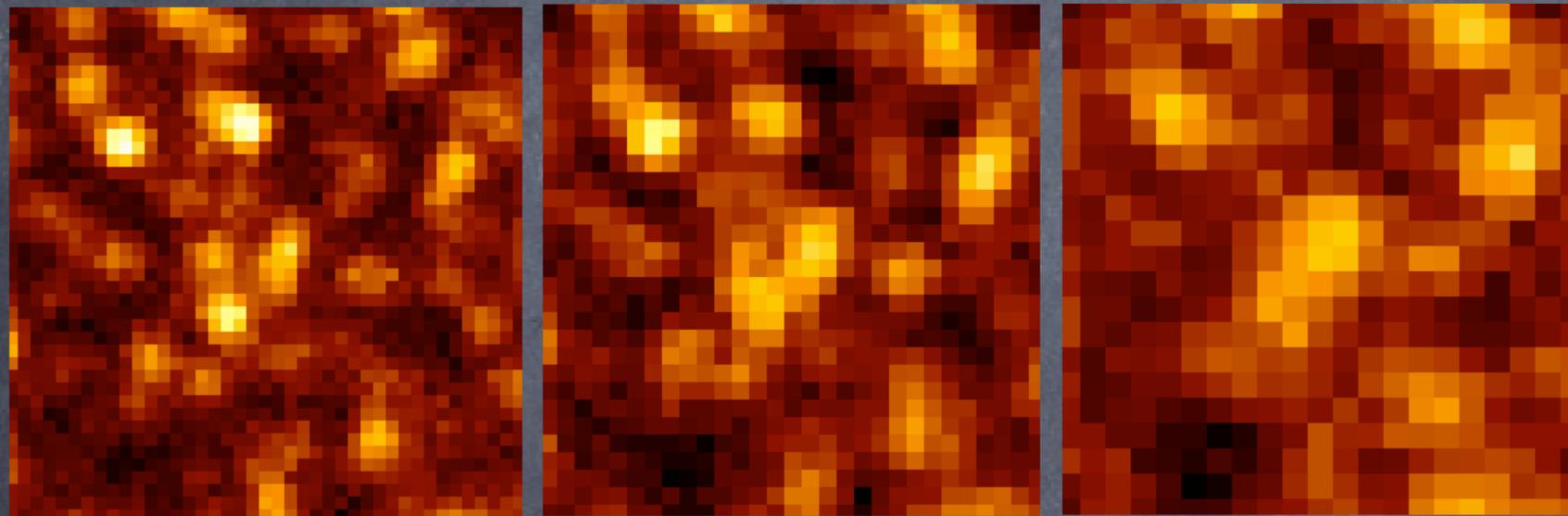
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Exciting times ahead

think EMU, WODAN... no shortage of candidates

# Tantalizing slide:

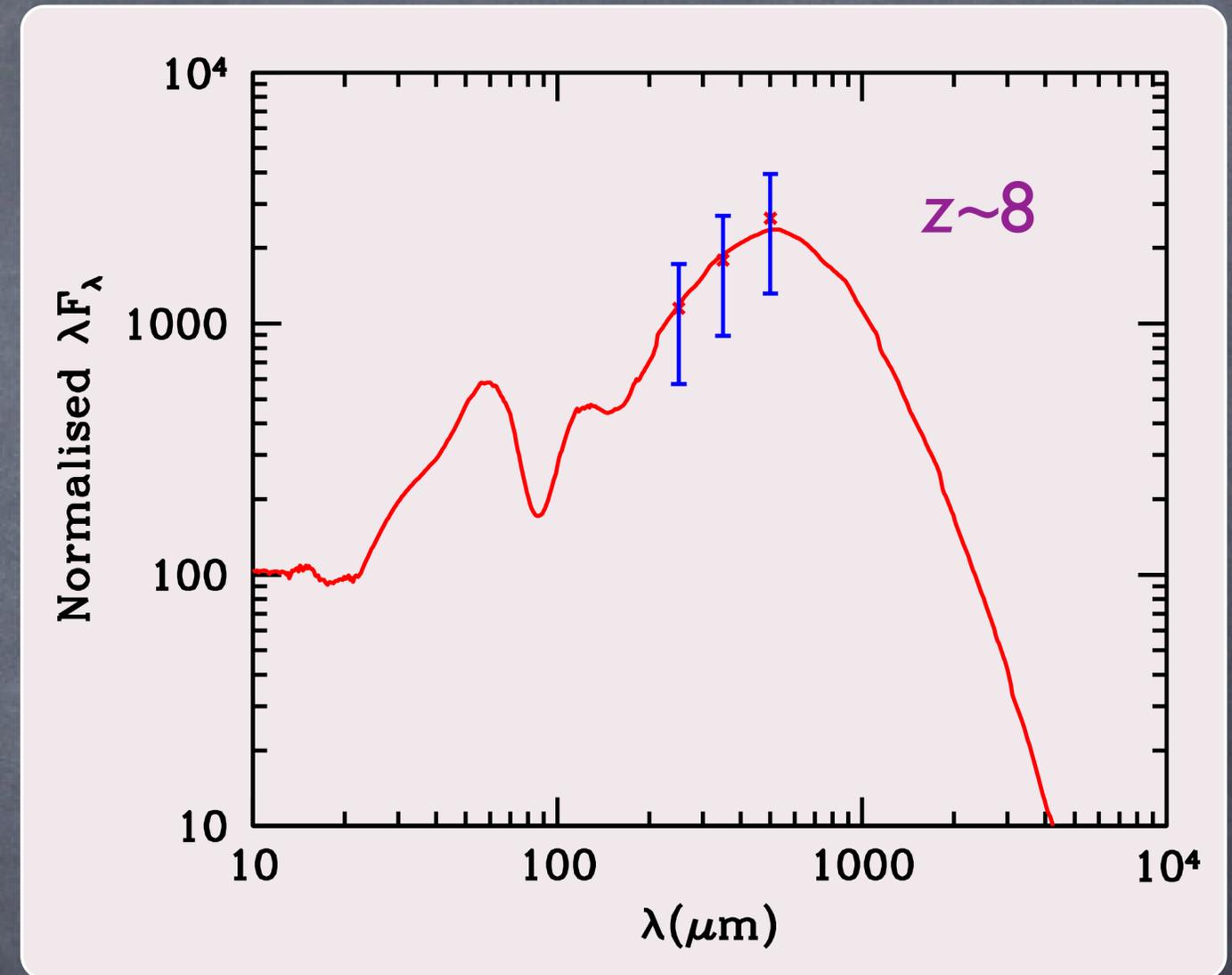
Based on the Infrared Faint Radio Source criteria:



250  $\mu\text{m}$

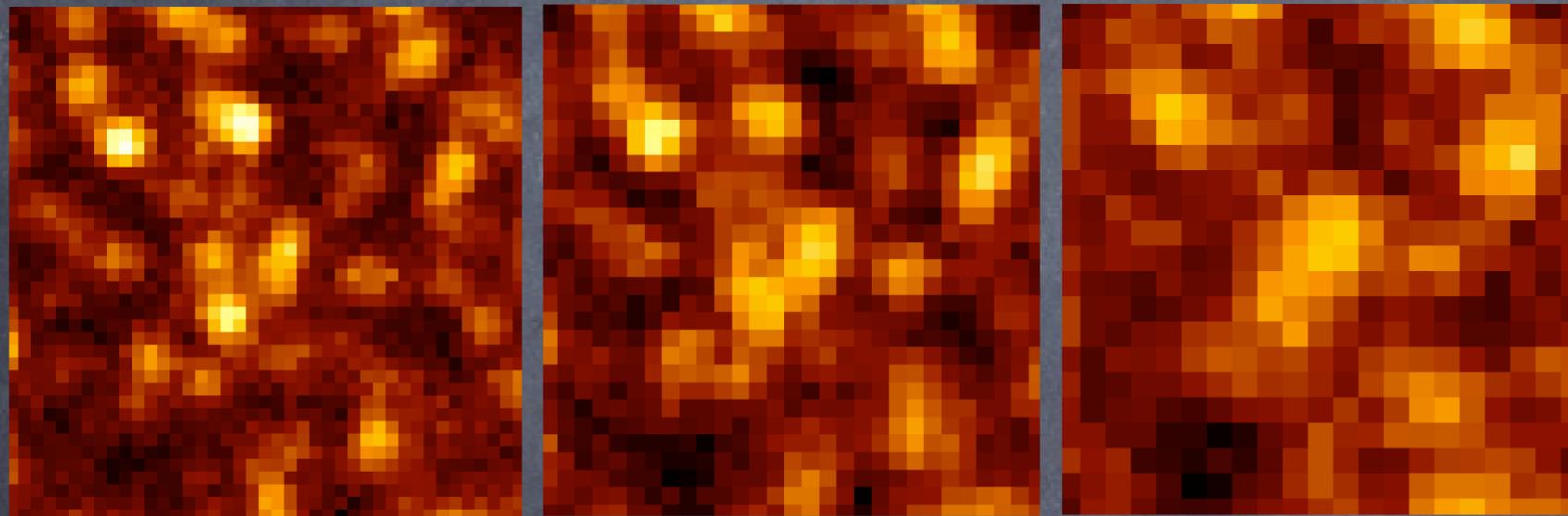
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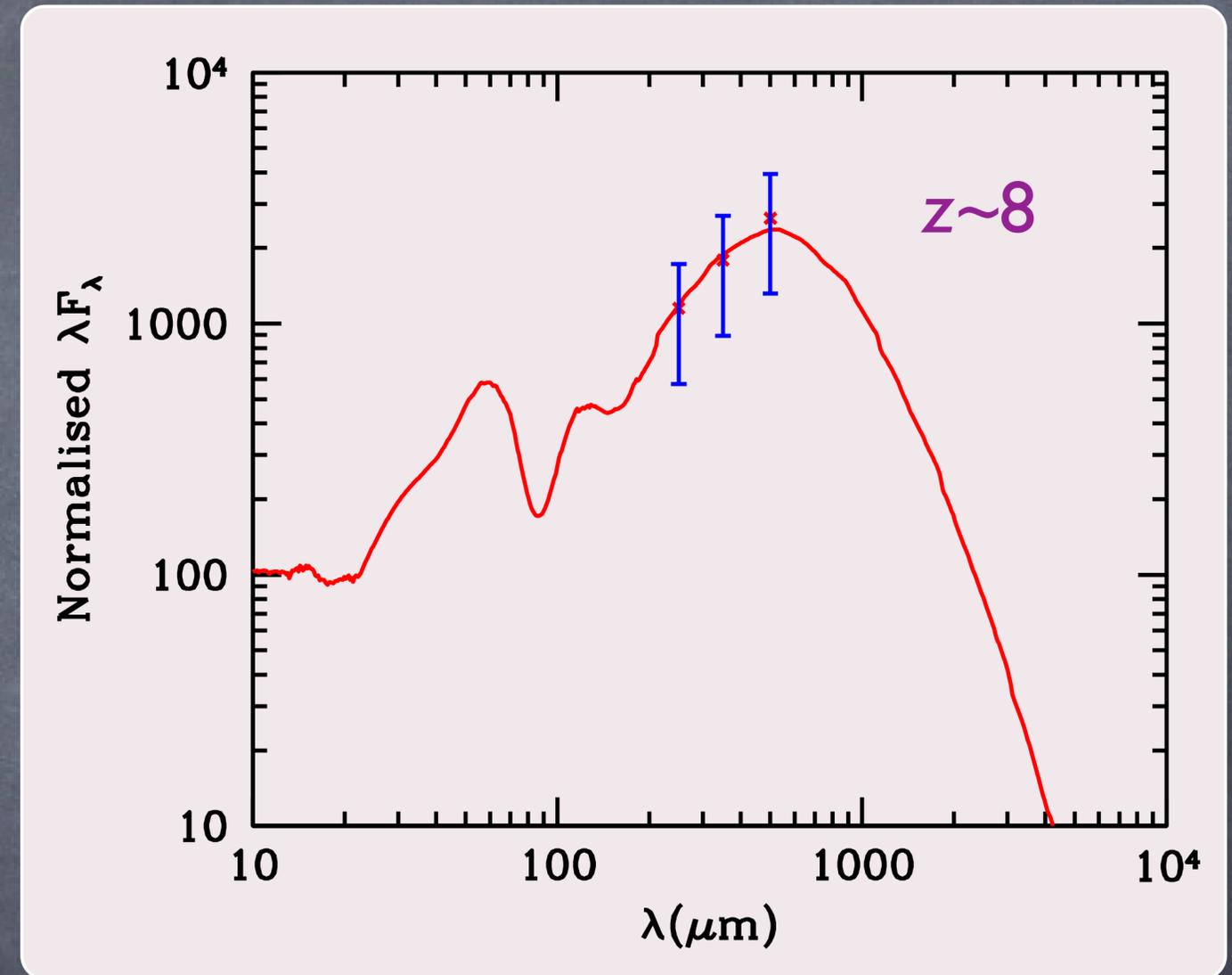
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confirmation soon...?!

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