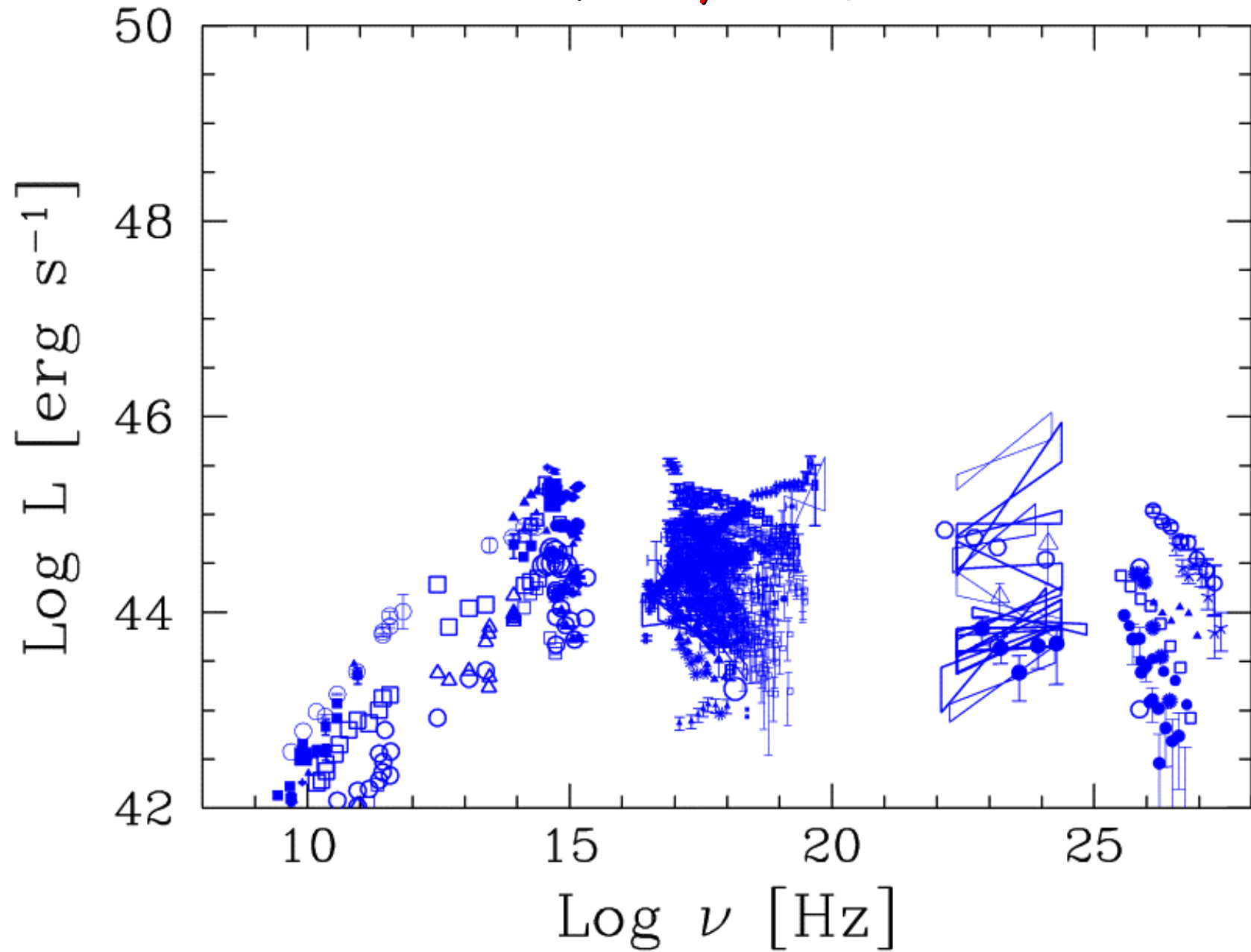


Fermi blazars

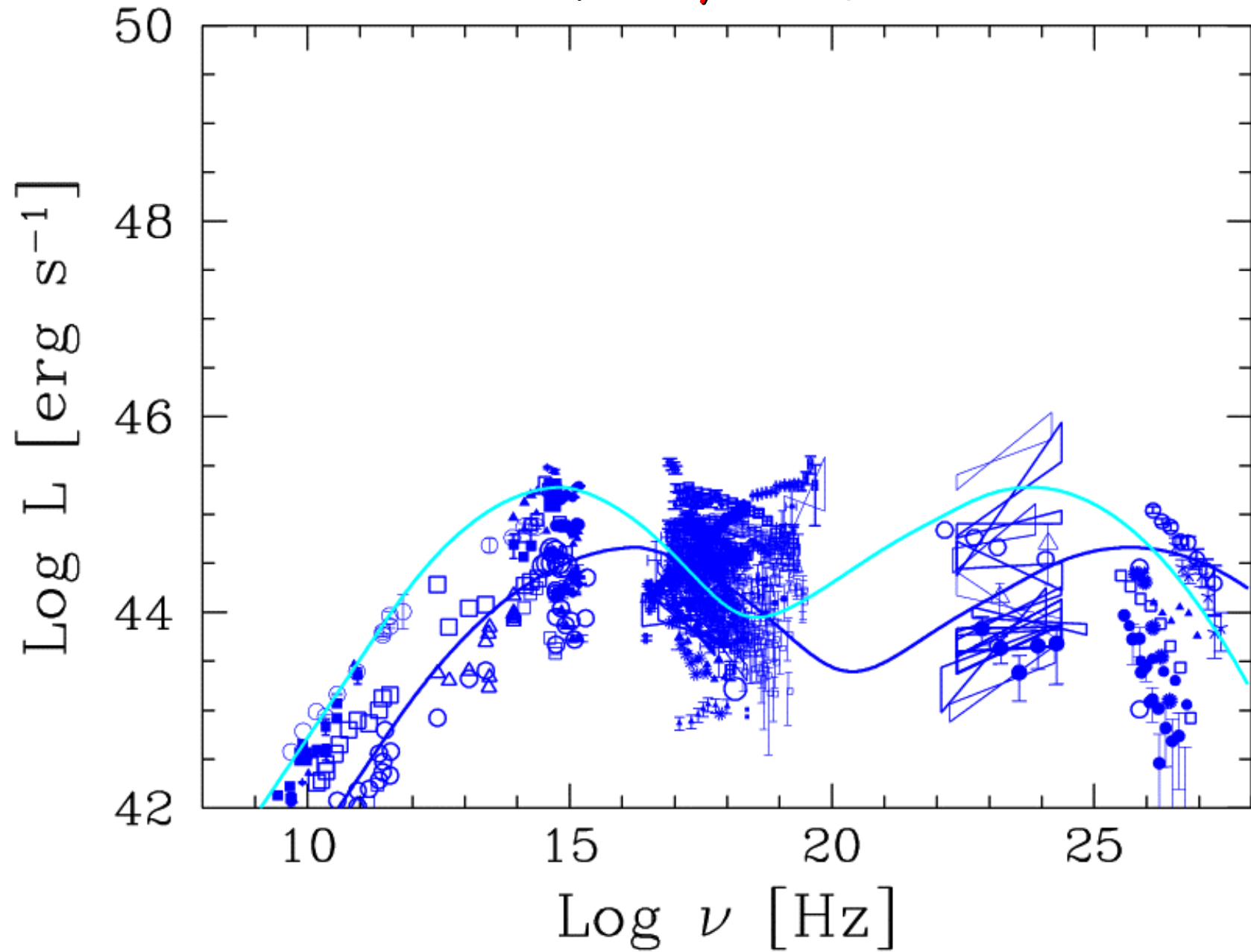
Gabriele Ghisellini

INAF - Osservatorio Astronomico di Brera

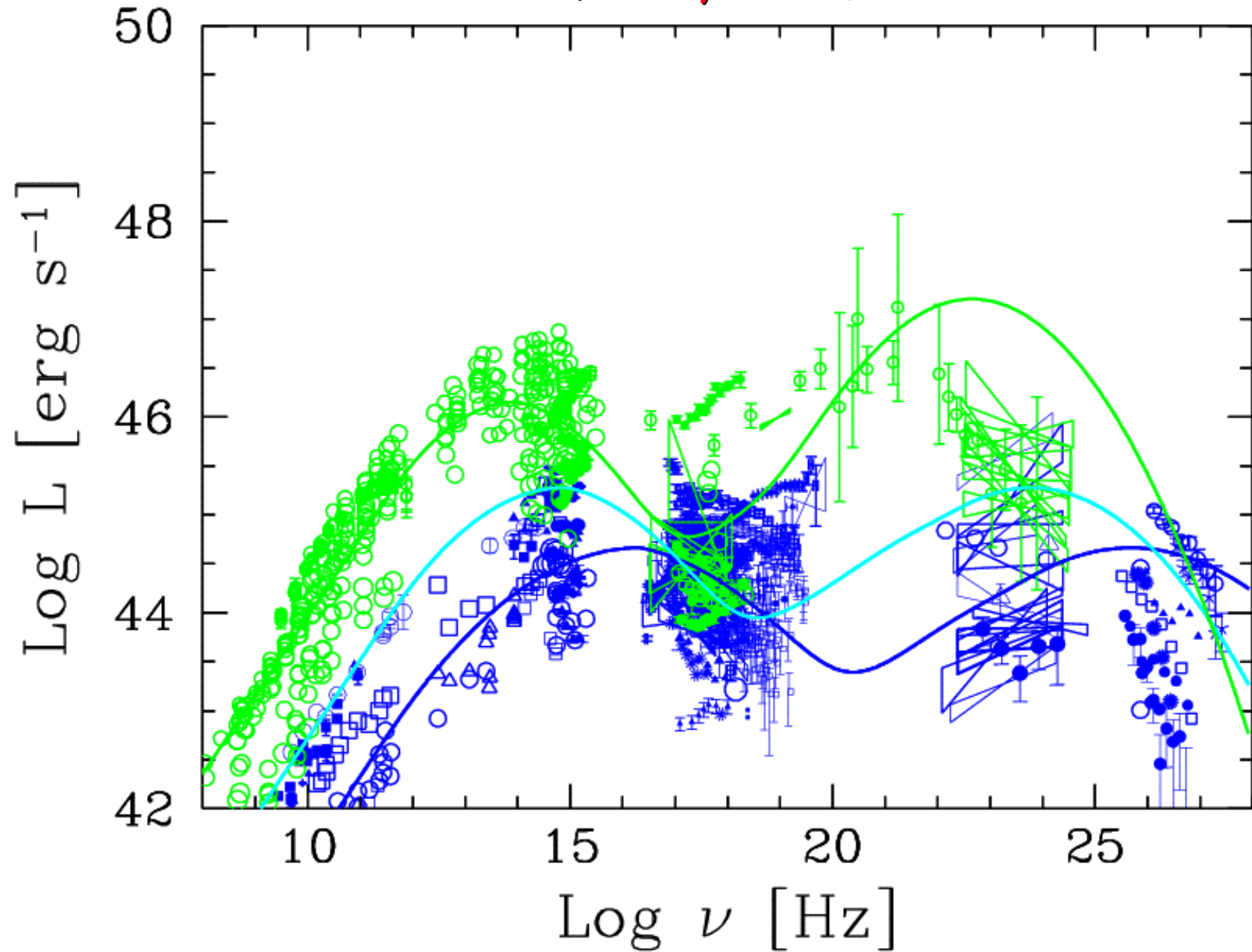
3 months, 10 σ



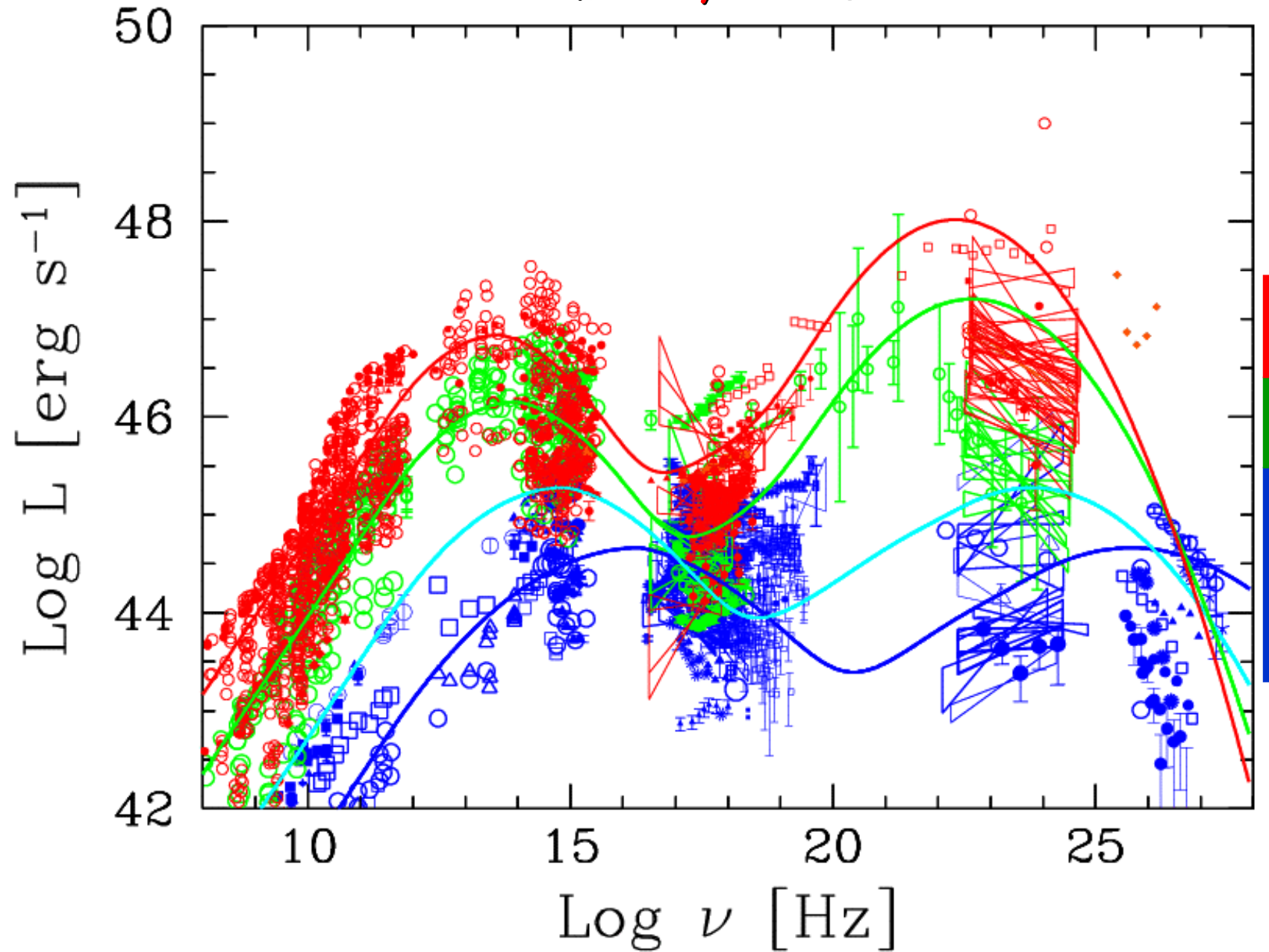
3 months, 10 σ



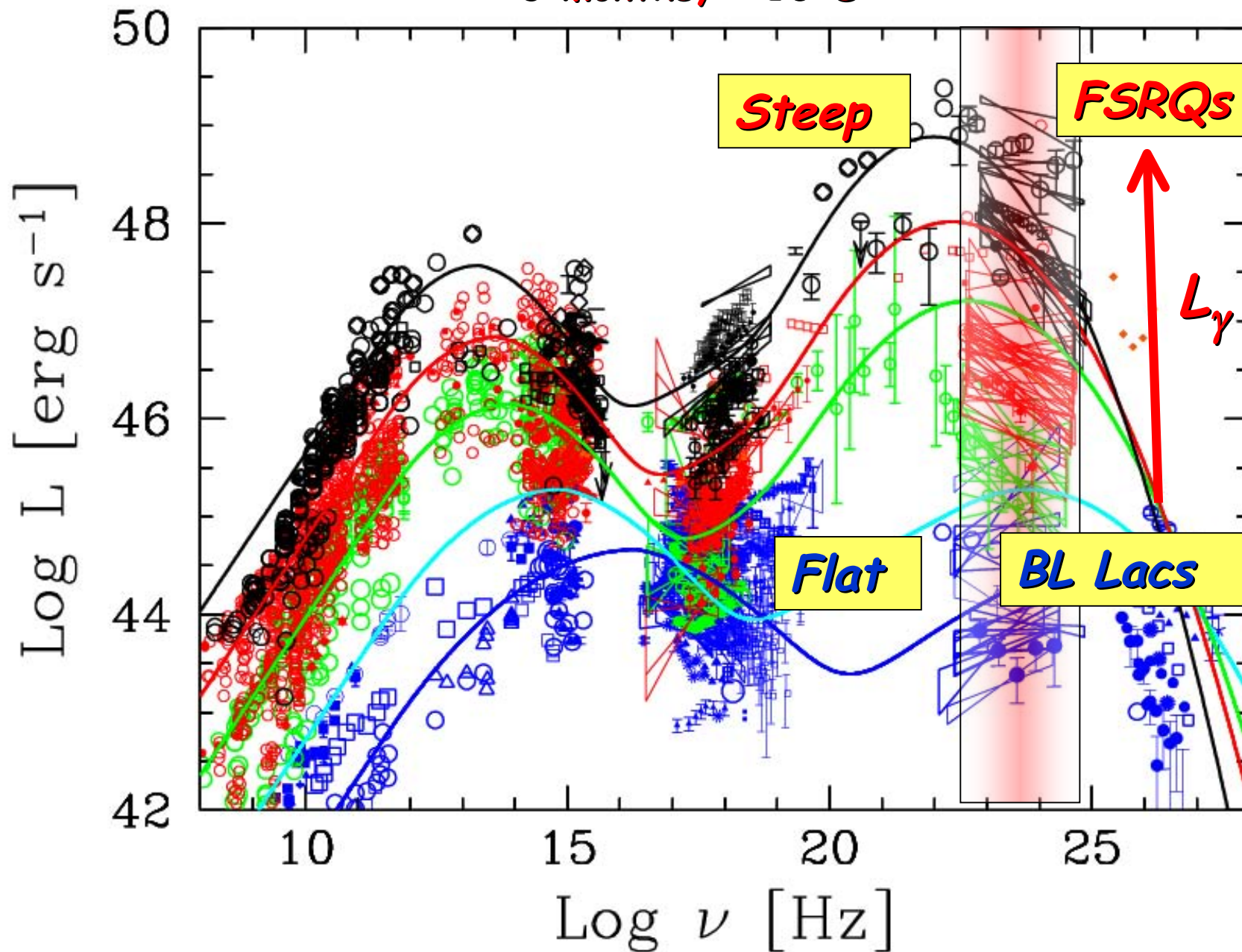
3 months, 10 σ



3 months, 10 σ

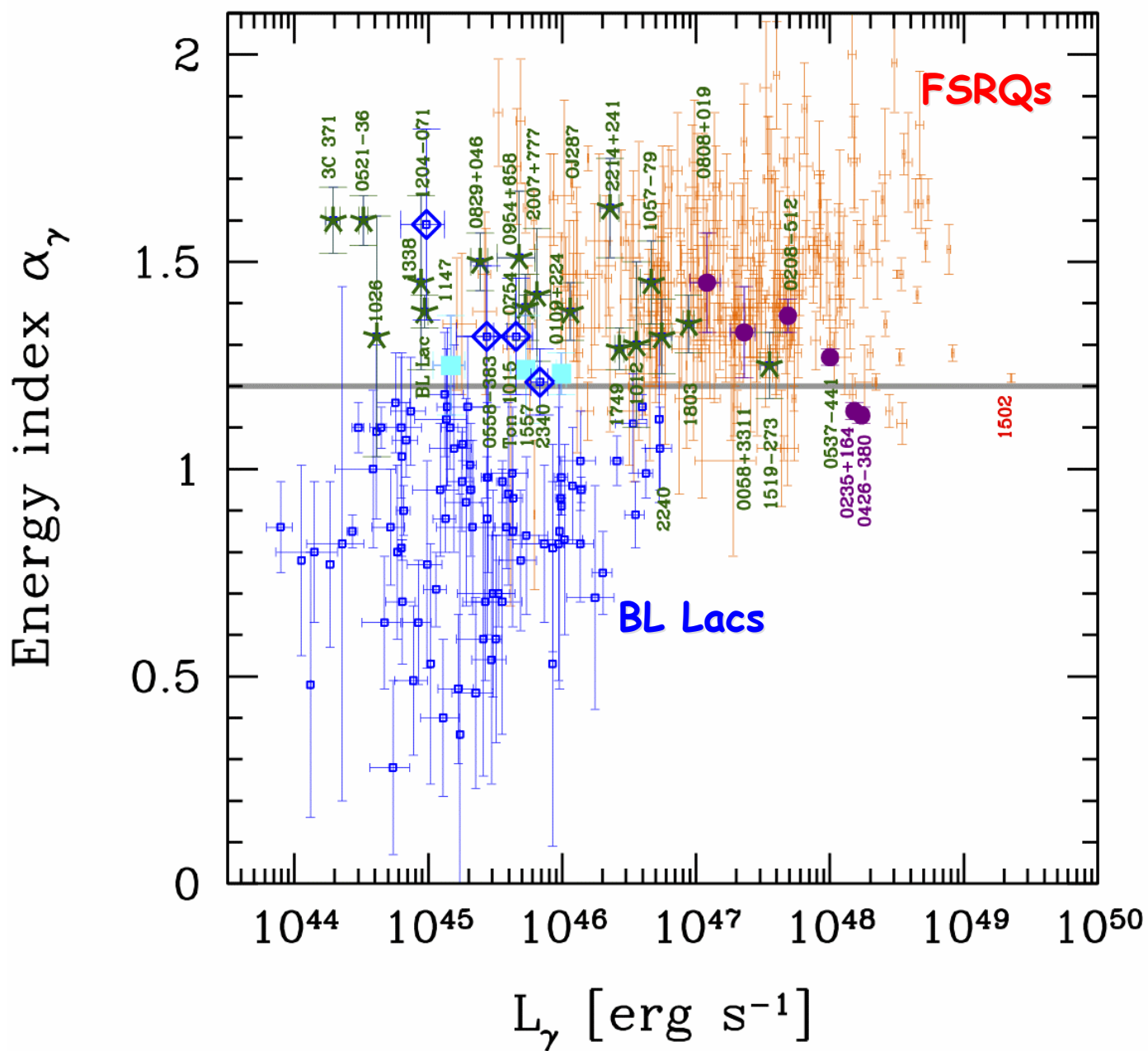


3 months, 10 σ

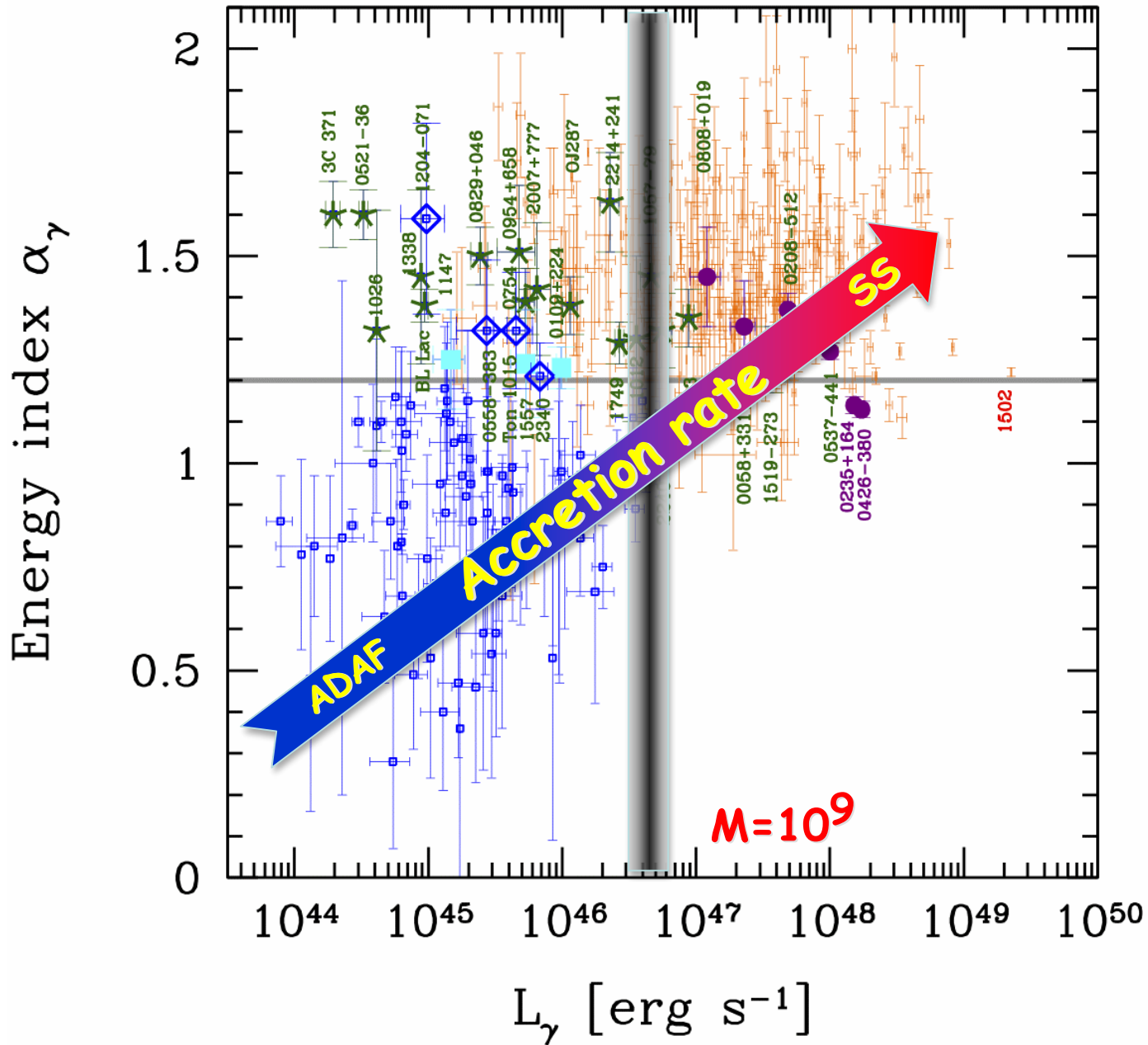


Fossati et al. 1998; Donato et al. 2001

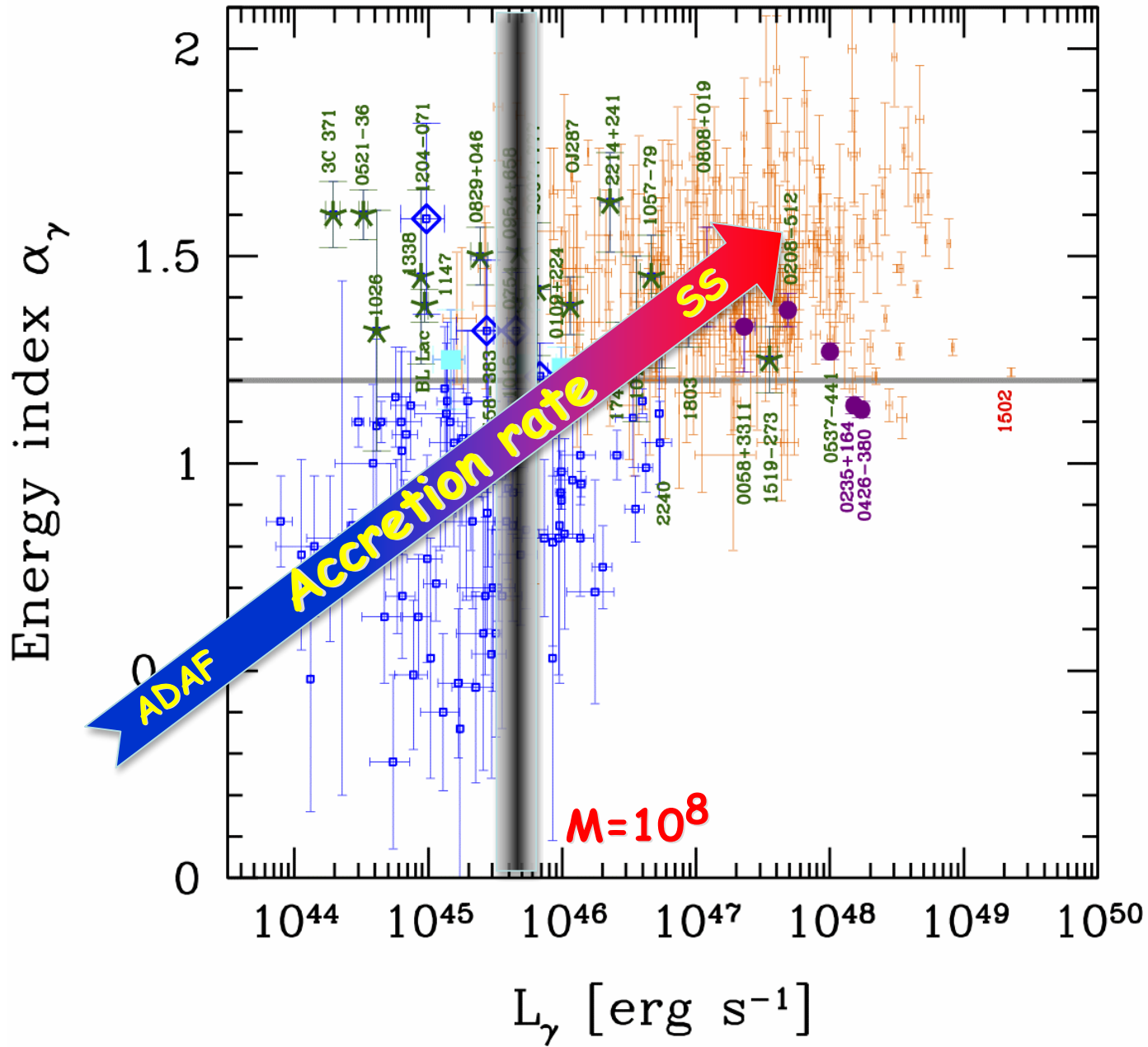
11 months - 4σ Abdo+ 2010



11 months - 4σ Abdo+ 2010

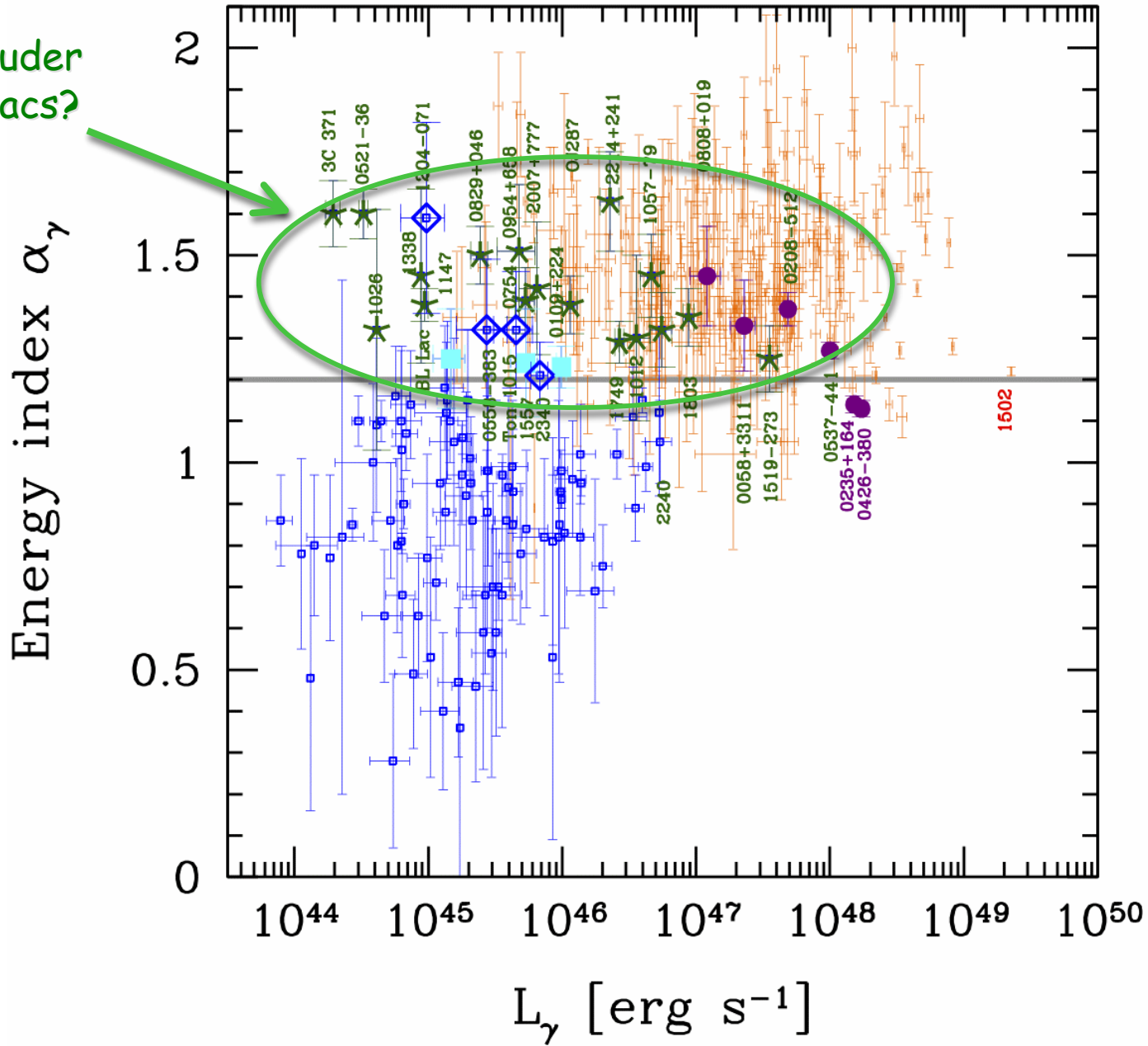


11 months - 4σ Abdo+ 2010

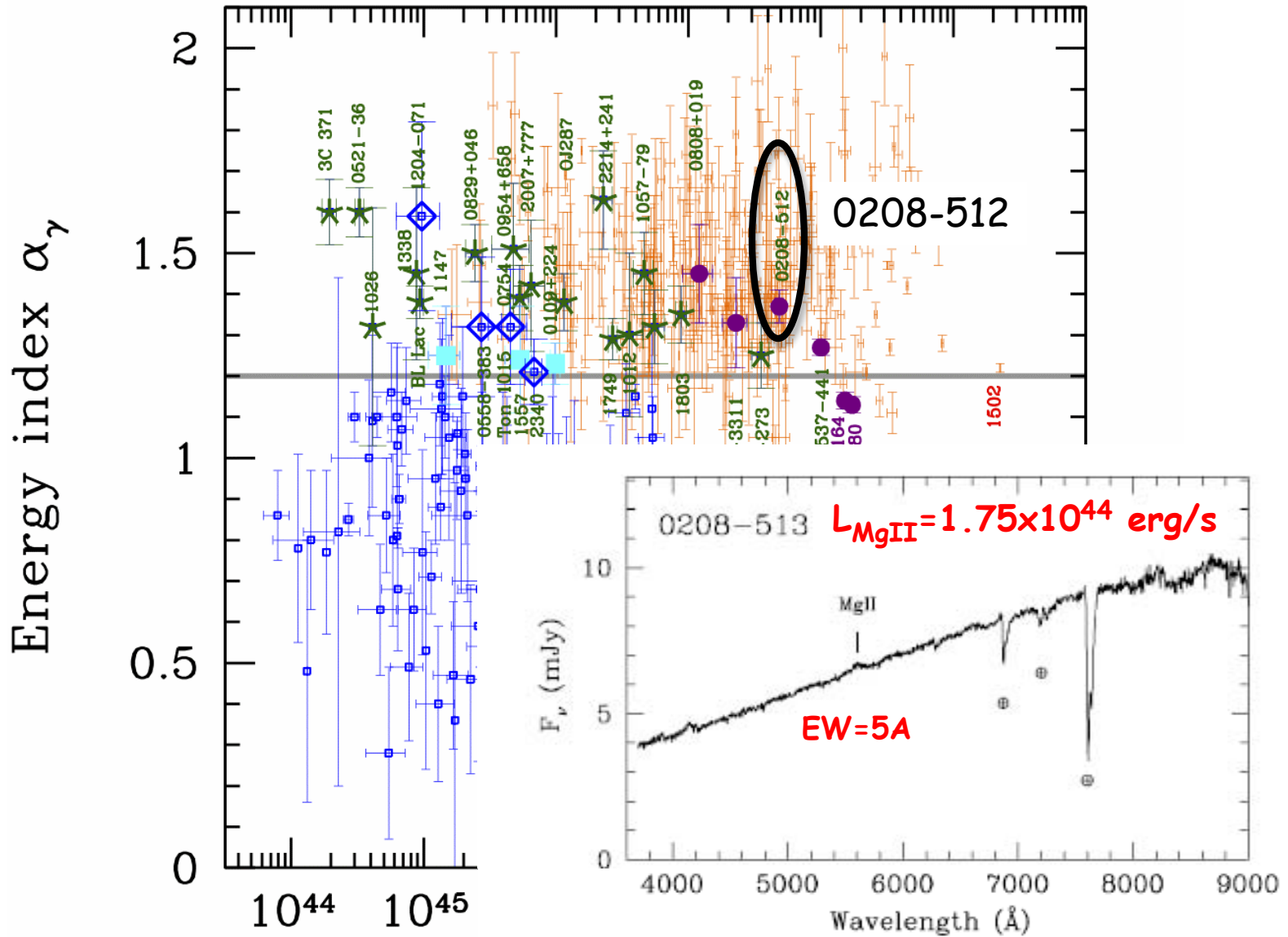


11 months - 4 σ Abdo+ 2010

Intruder
BL Lacs?



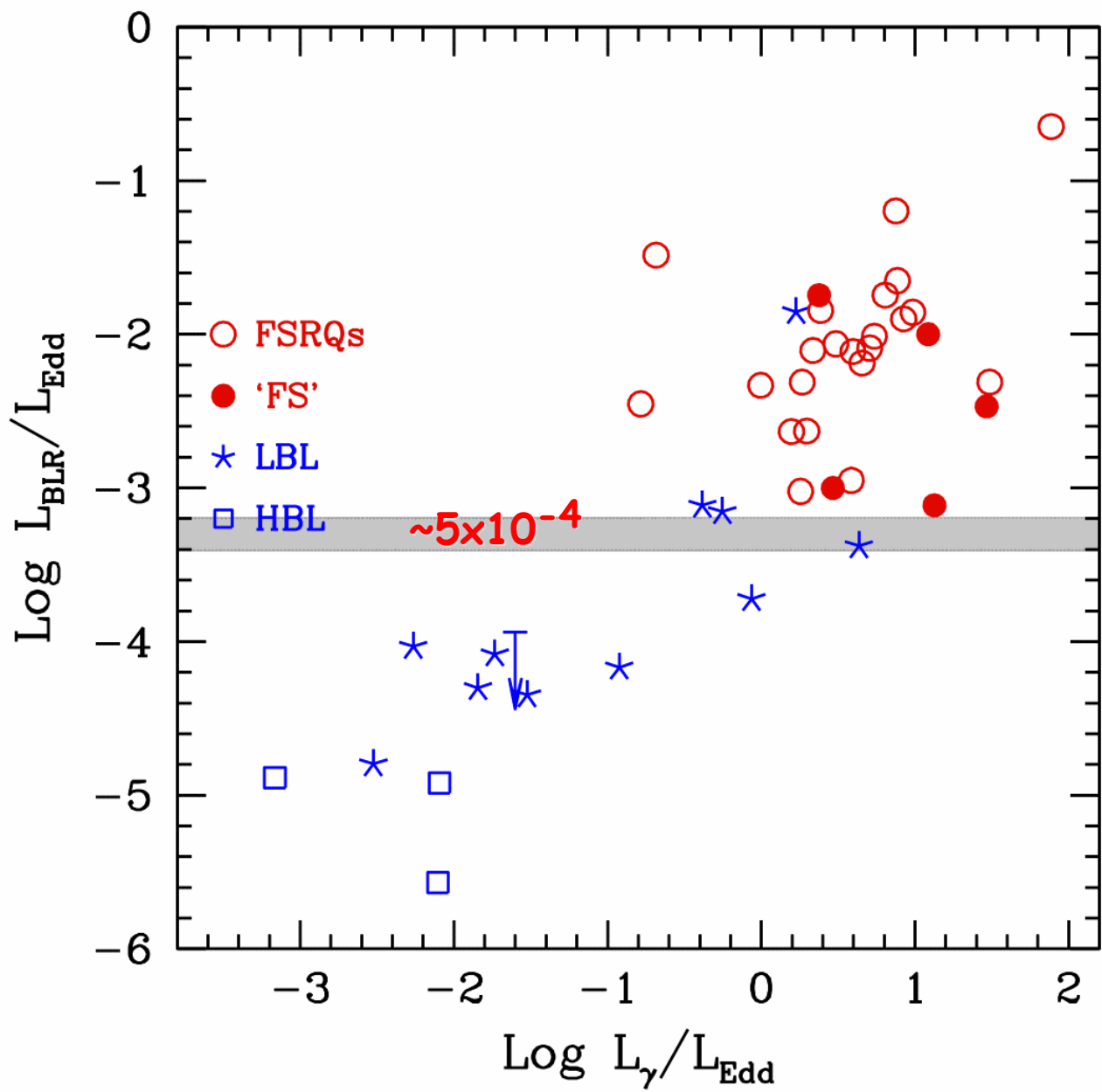
11 months - 4σ



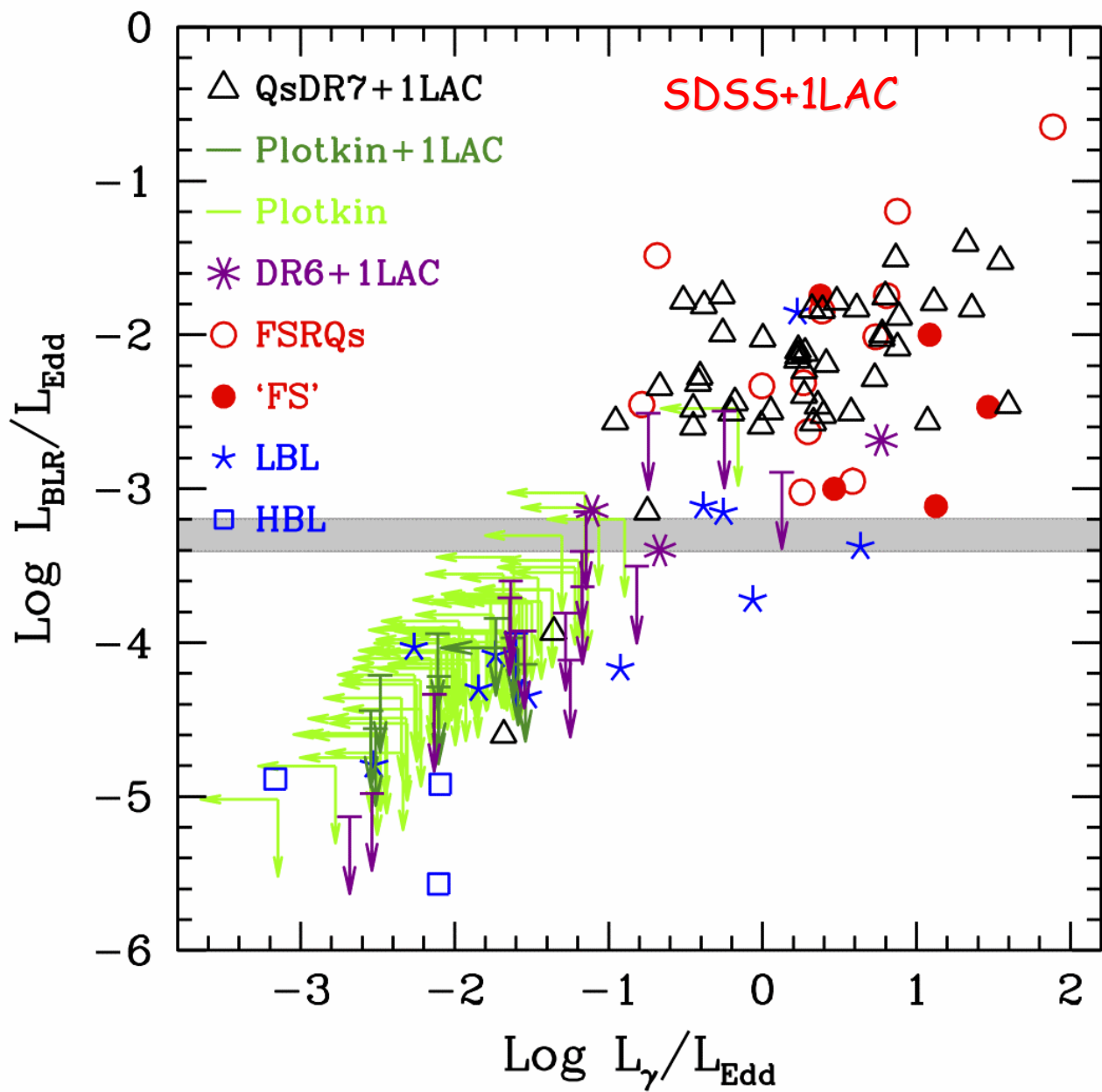
Scarpa & Falomo 1997
 L_γ [erg s^{-1}]

When a BL Lac is a BL Lac?

- ◆ Usually, $EW < 5\text{\AA}$
- ◆ Easy, but not physical
- ◆ Better to measure L_{BLR}
- ◆ But normalize it to L_{Edd}

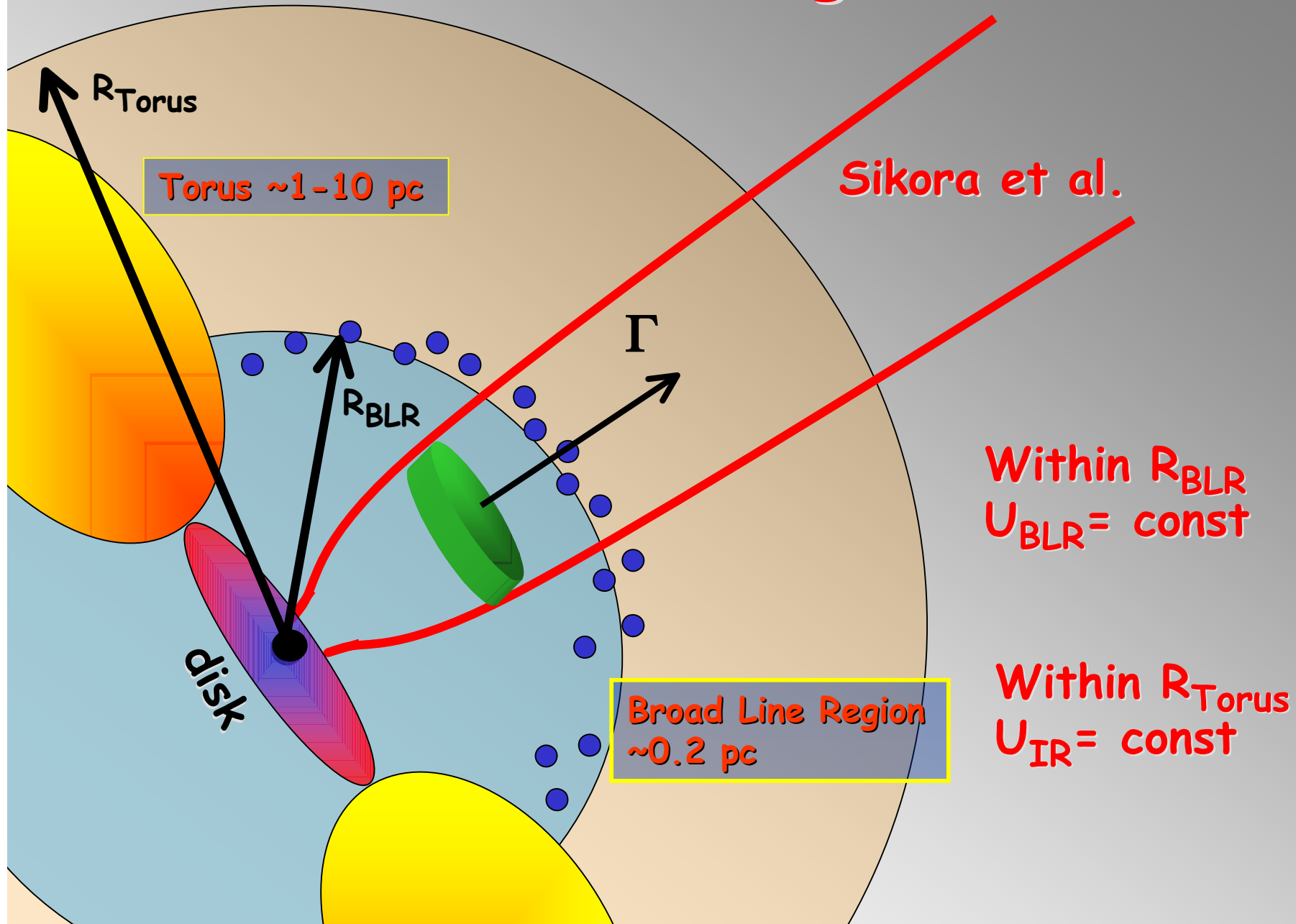


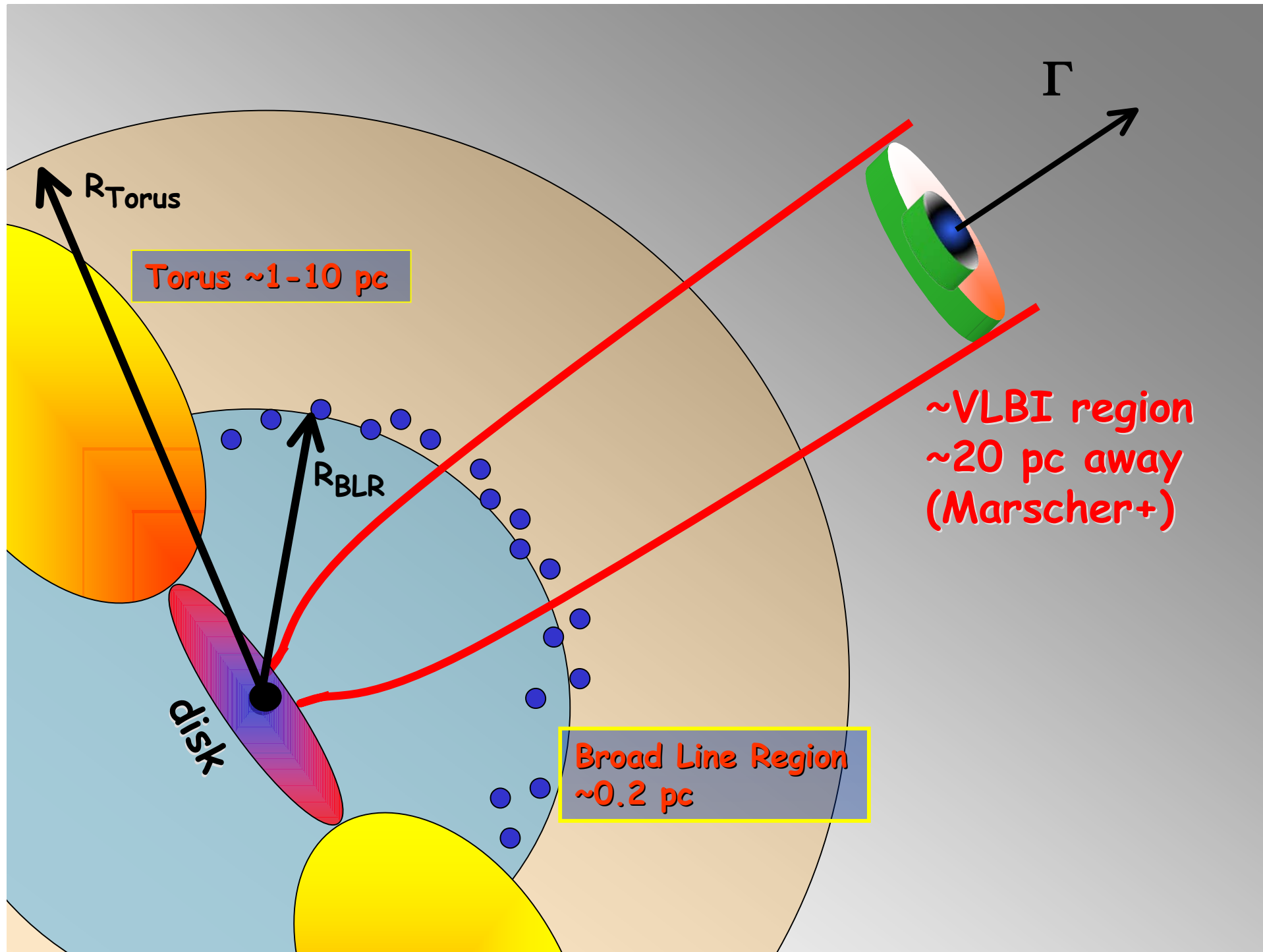
GG+ 2011



Modeling

Modeling





jet power and accretion luminosity

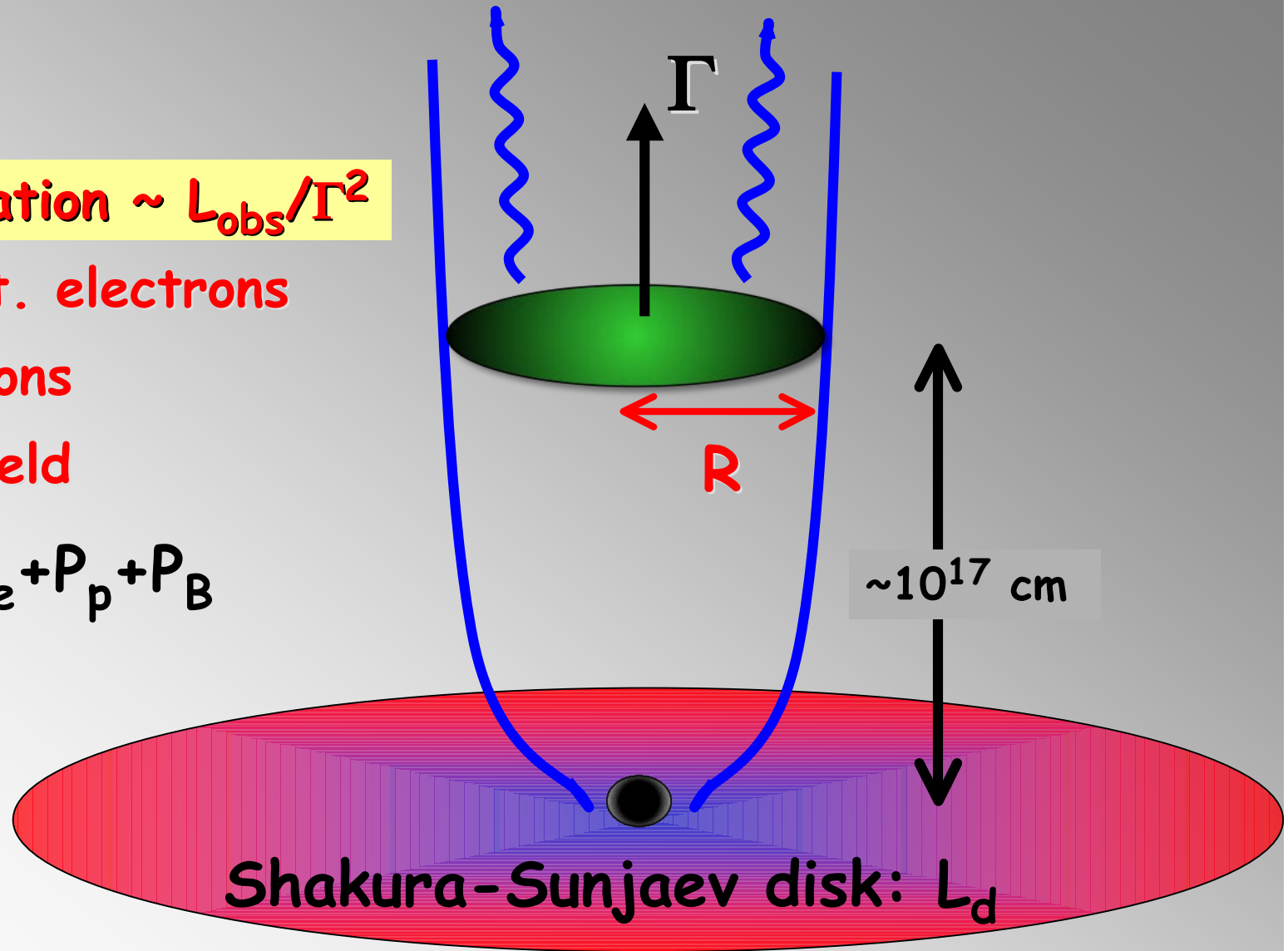
$$P_r = \text{radiation} \sim L_{\text{obs}}/\Gamma^2$$

P_e = relat. electrons

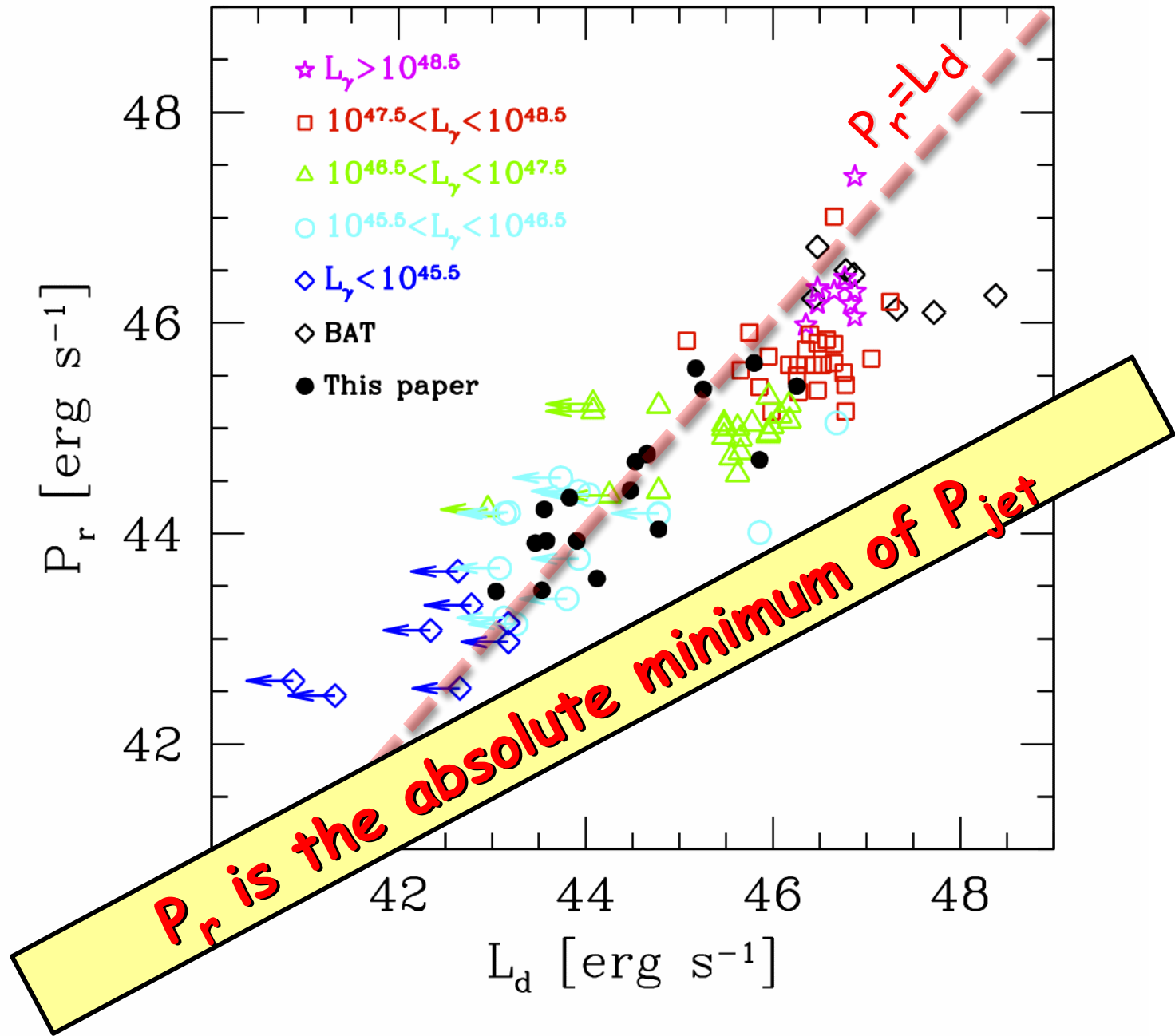
P_p = protons

P_B = B-field

$$P_{\text{jet}} = P_e + P_p + P_B$$



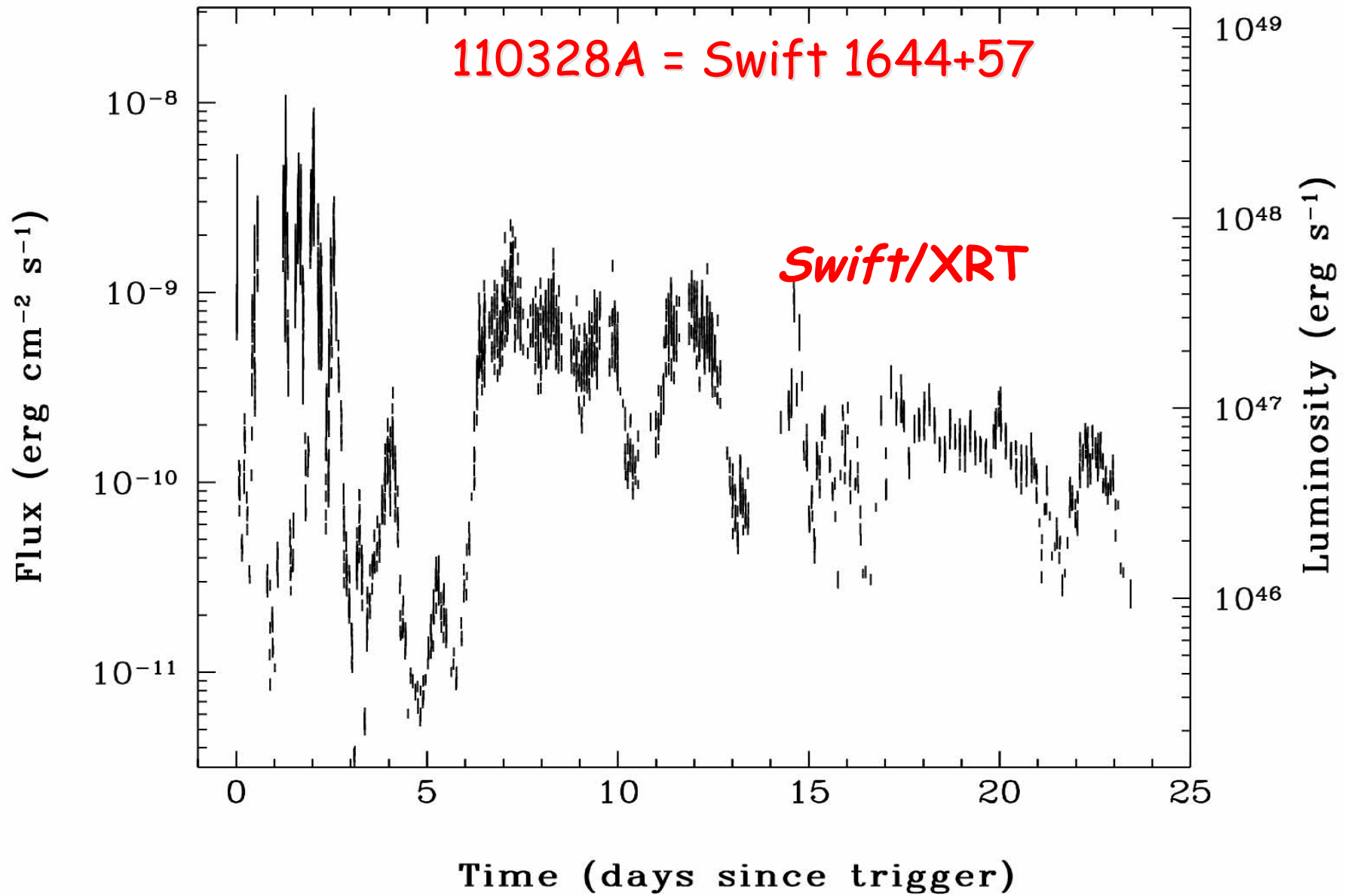
$P_r \sim L_{\text{obs}}/\Gamma^2$ "model independent"



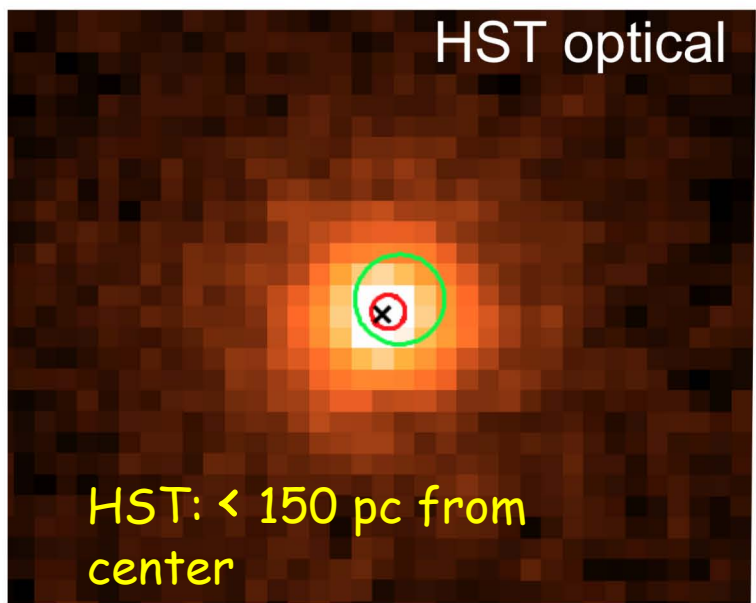
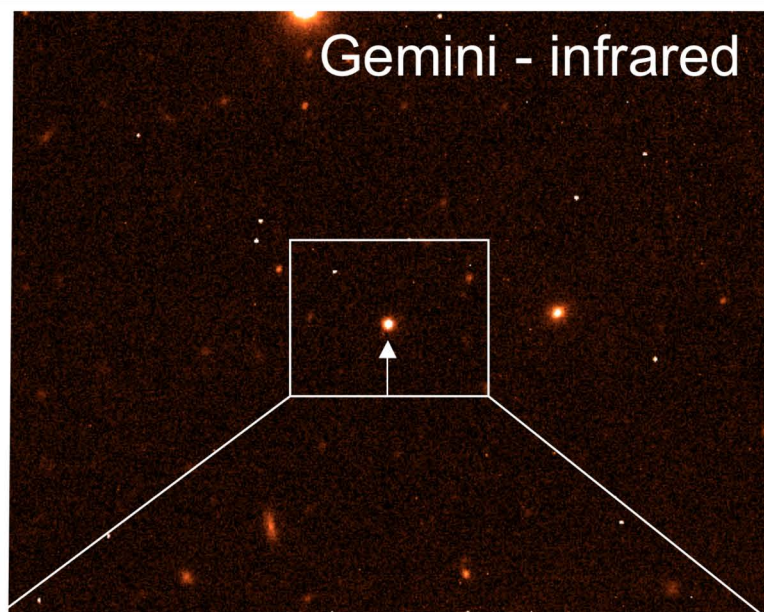
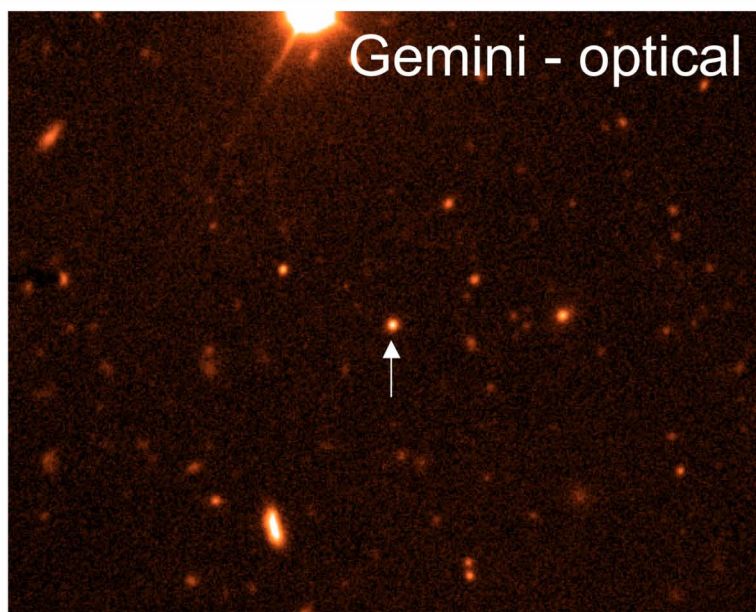
Pause

- $P_{\text{jet}} \sim \dot{M}c^2$, even larger than L_d
- For all $\dot{M}/\dot{M}_{\text{Edd}}$
- BL Lacs \rightarrow ADAF FSRQs \rightarrow SS
- $L_{\text{BLR}}/L_{\text{Edd}}$ divides BL Lacs from FSRQs
- Matter, not magnetic, dominated

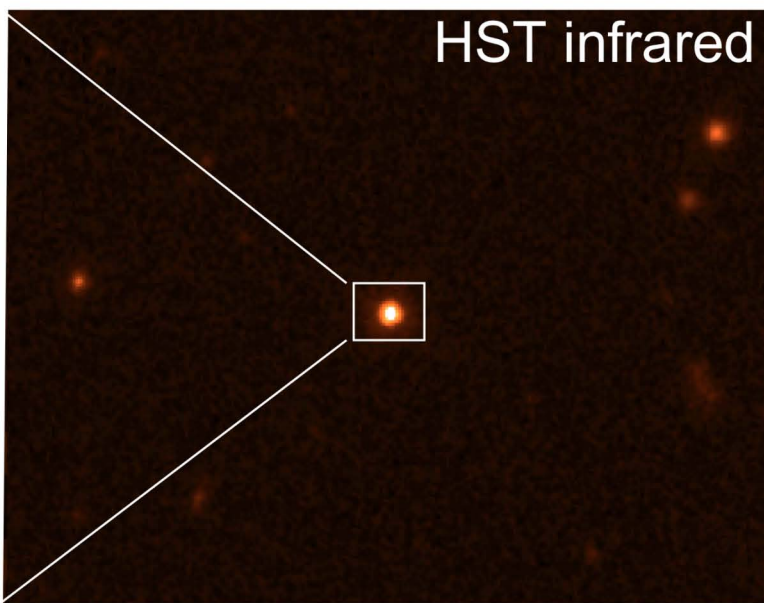
When a massive and
dormant BH wakes up



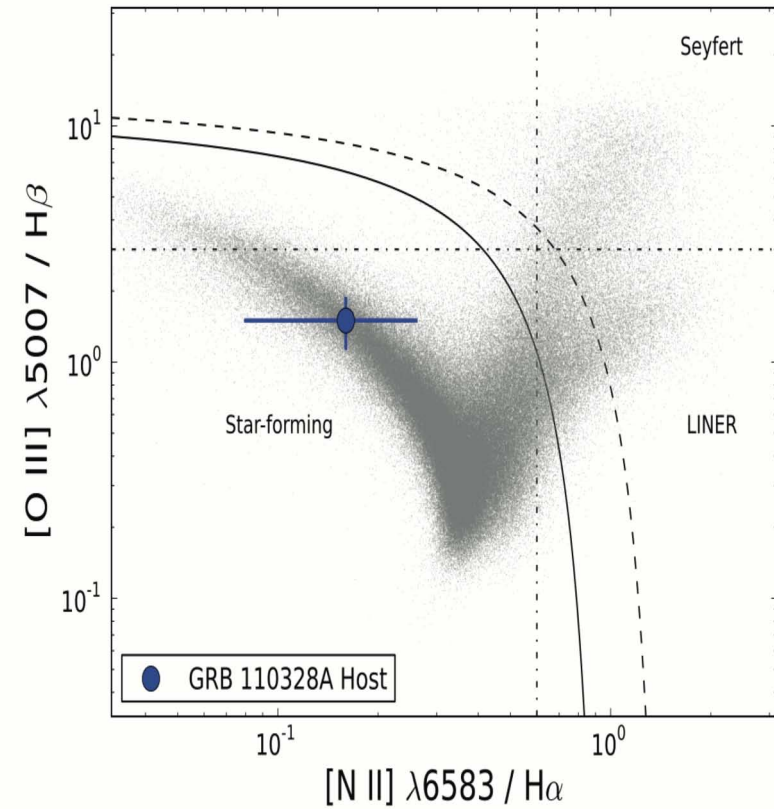
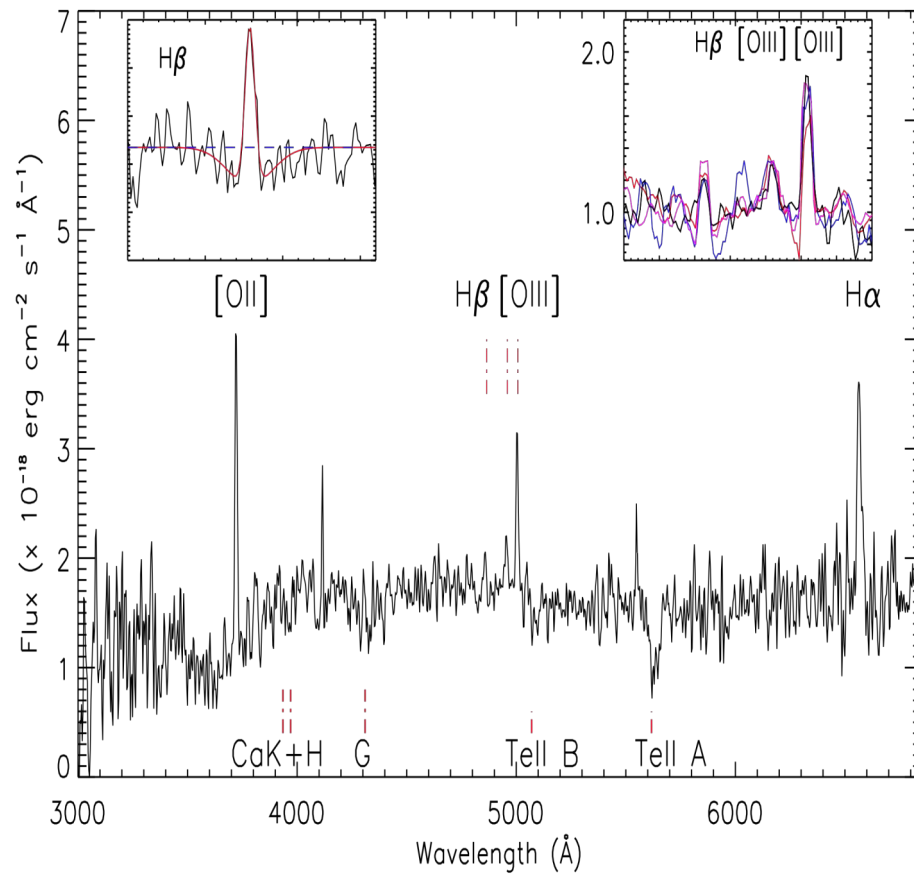
Burrows+ [astro-ph/1104.4787](https://arxiv.org/abs/astro-ph/1104.4787)



HST: < 150 pc from center

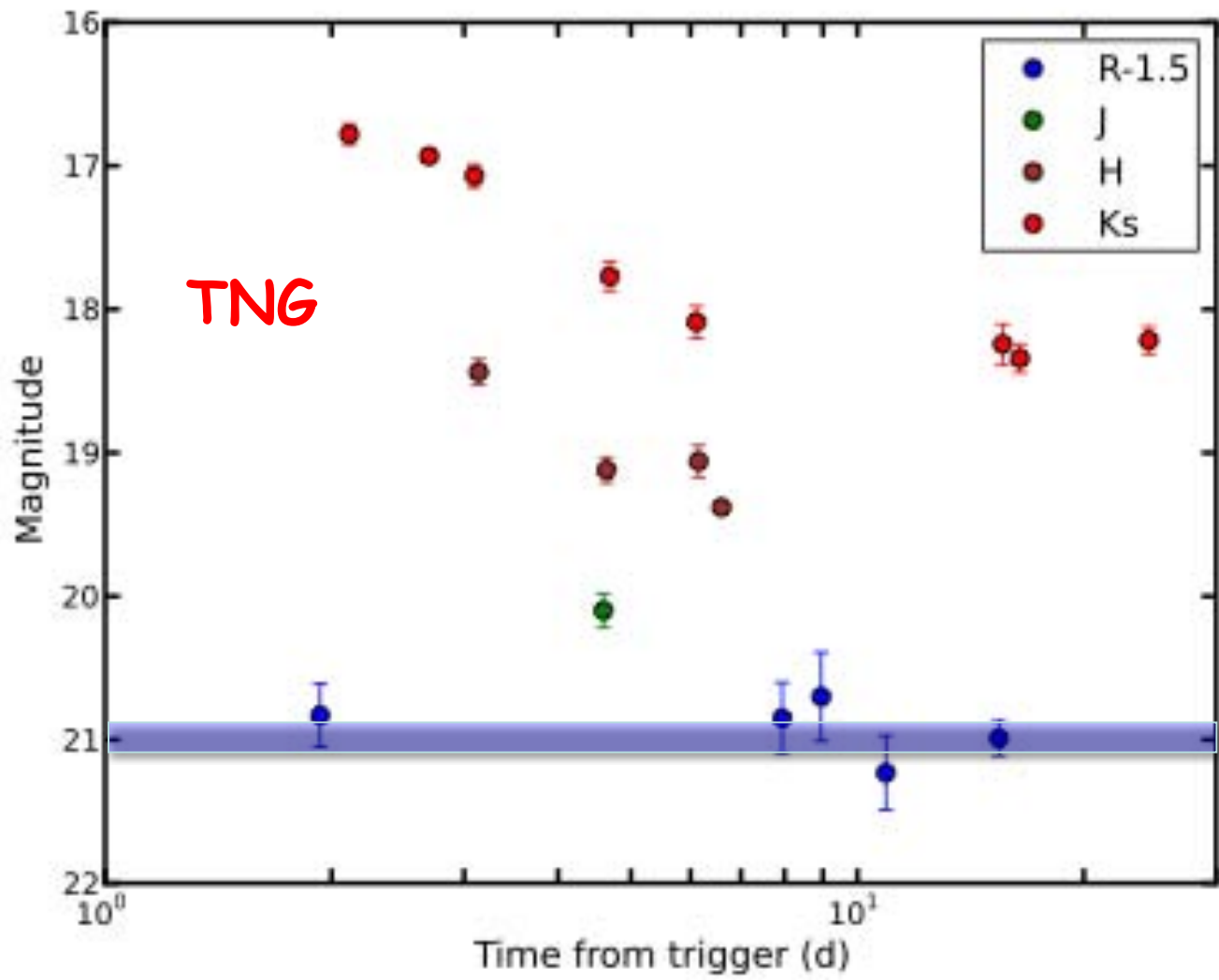


Levan+ astro-ph/1104.3356

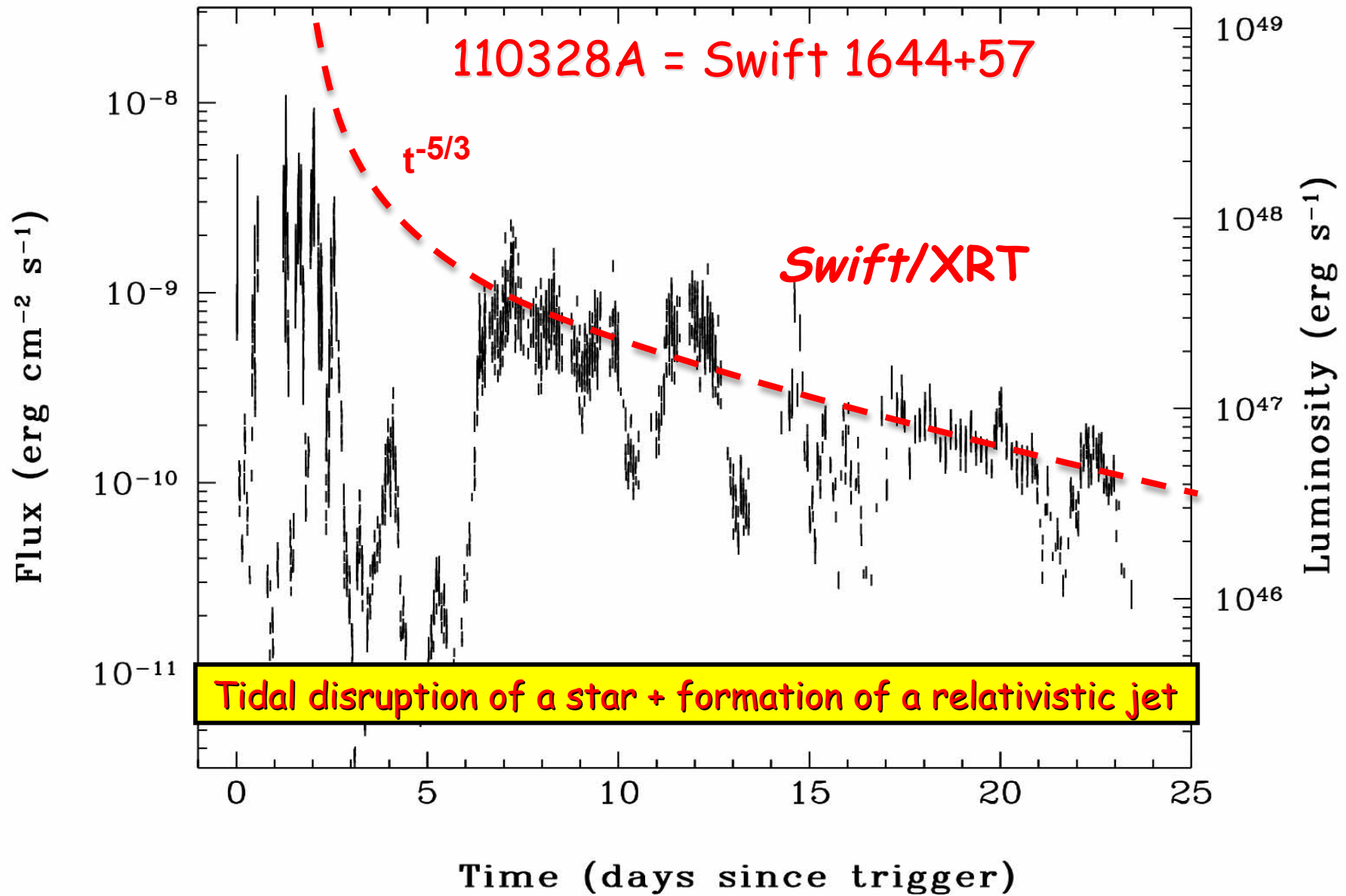


Levan+ astro-ph/1104.3356

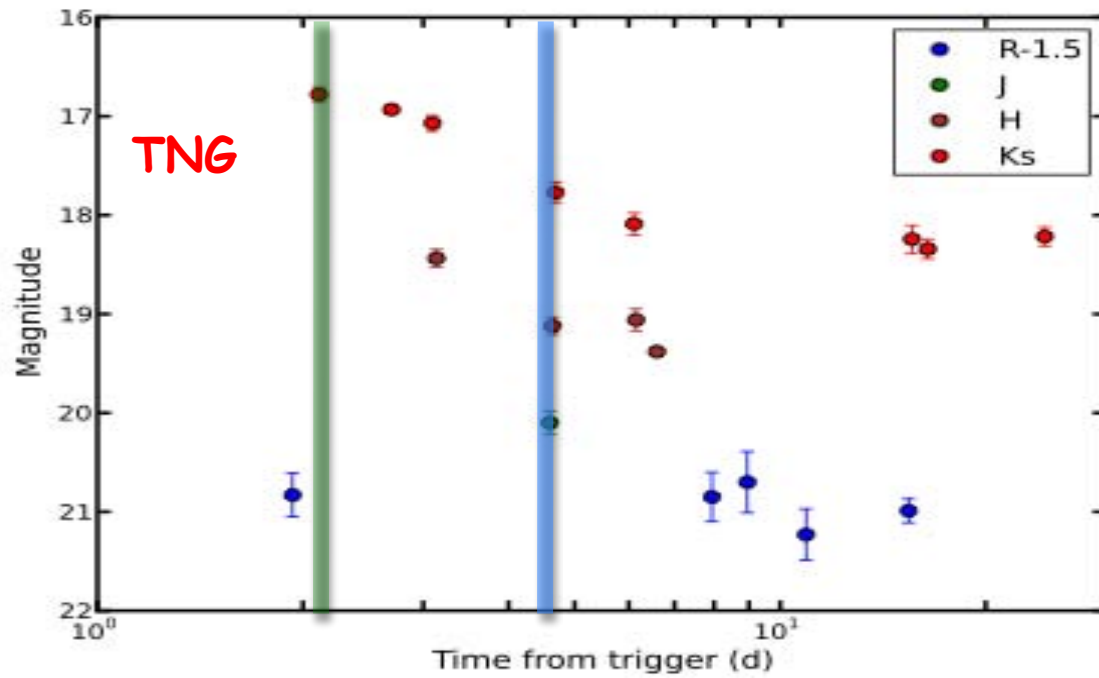
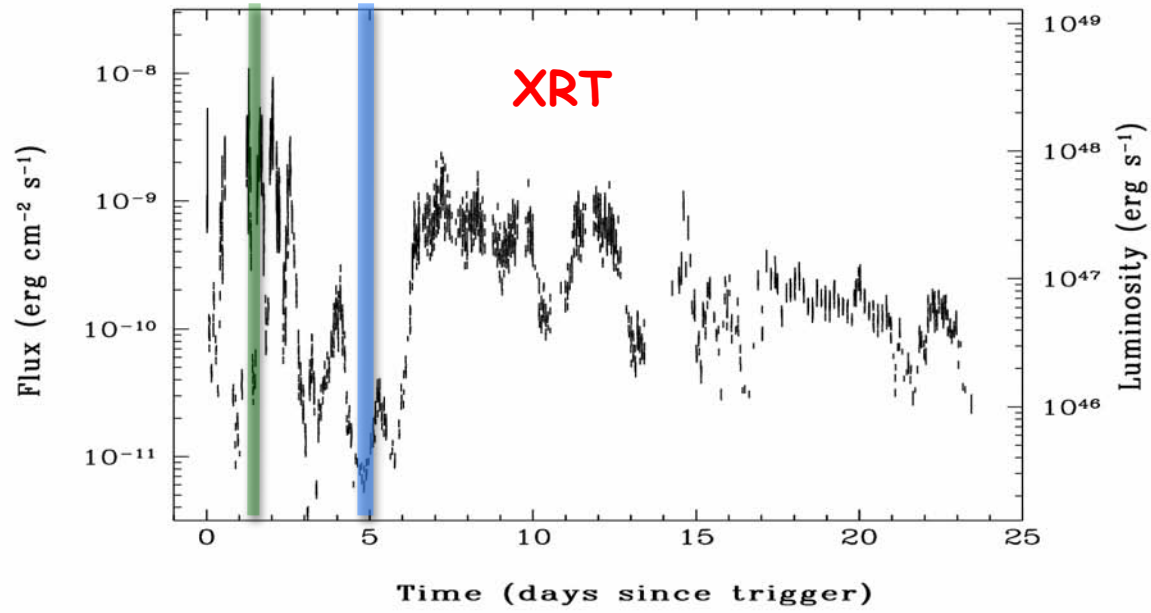
A small starburst galaxy
 Total mass = 10^9 - $10^{10} M_{\odot}$
 $M_{\text{BH}} \sim 10^6$ - $10^7 M_{\odot}$
 $z=0.3534$



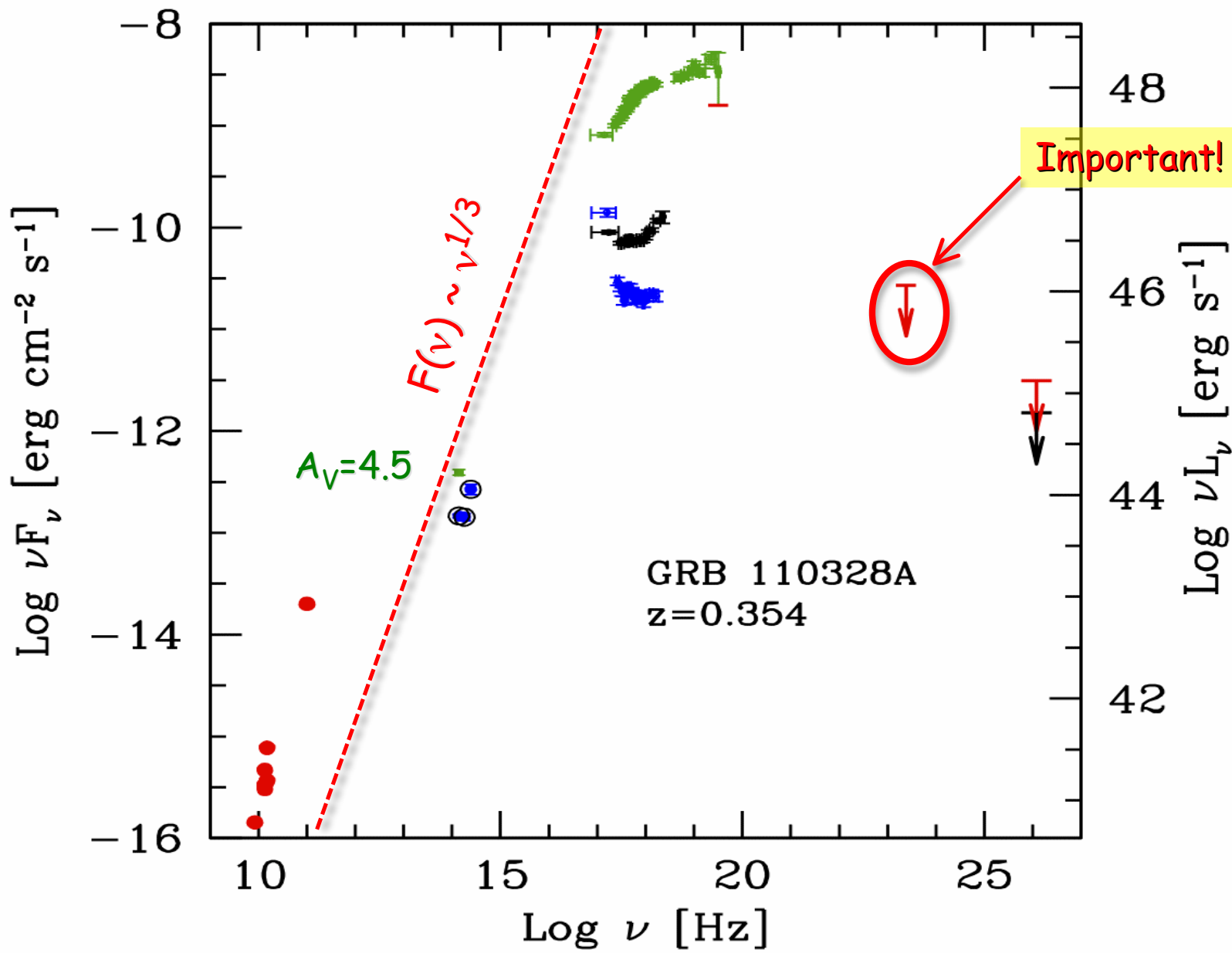
Burrows+ astro-ph/1104.4787



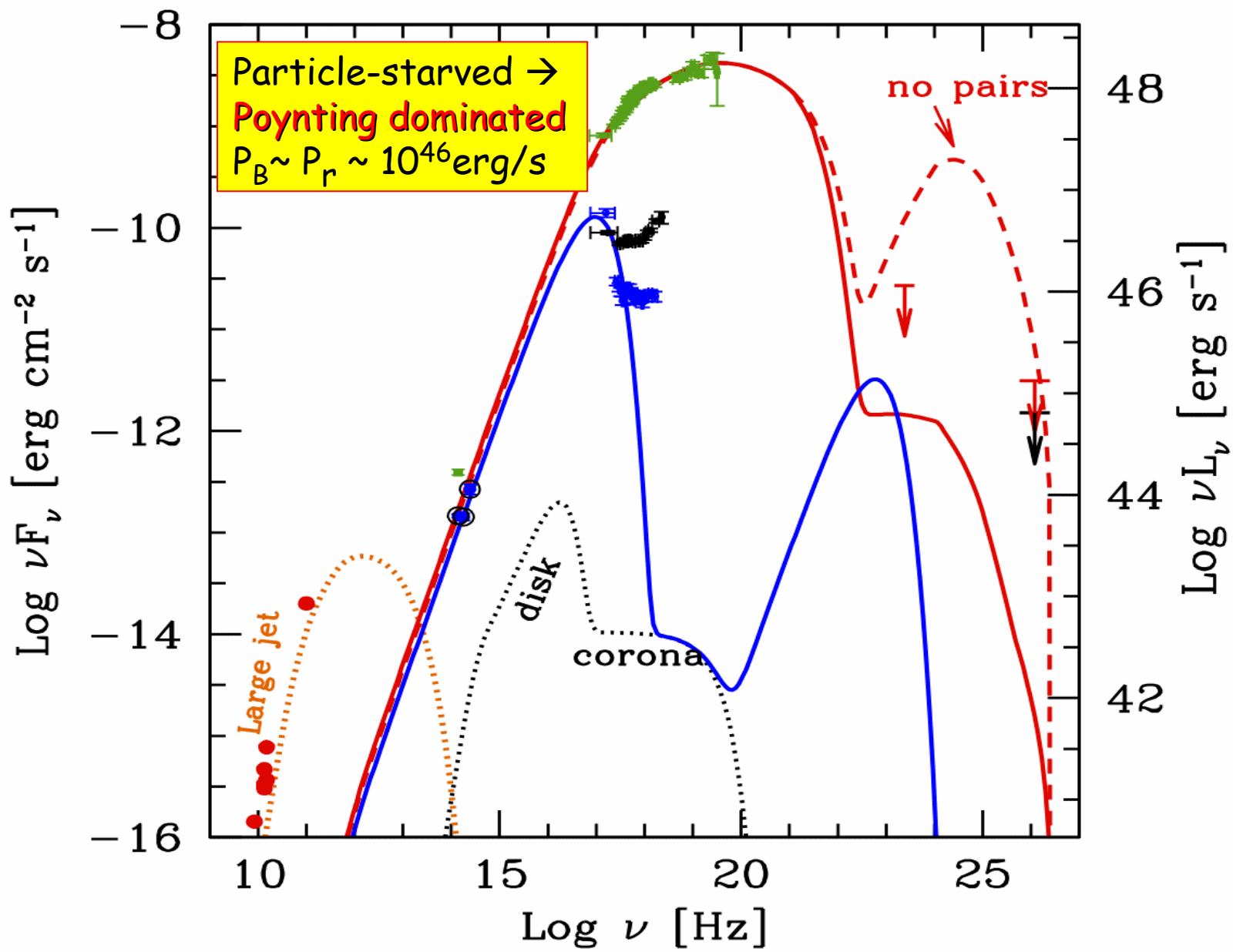
Burrows+ [astro-ph/1104.4787](https://arxiv.org/abs/astro-ph/1104.4787)



Burrows+ astro-ph/1104/4787

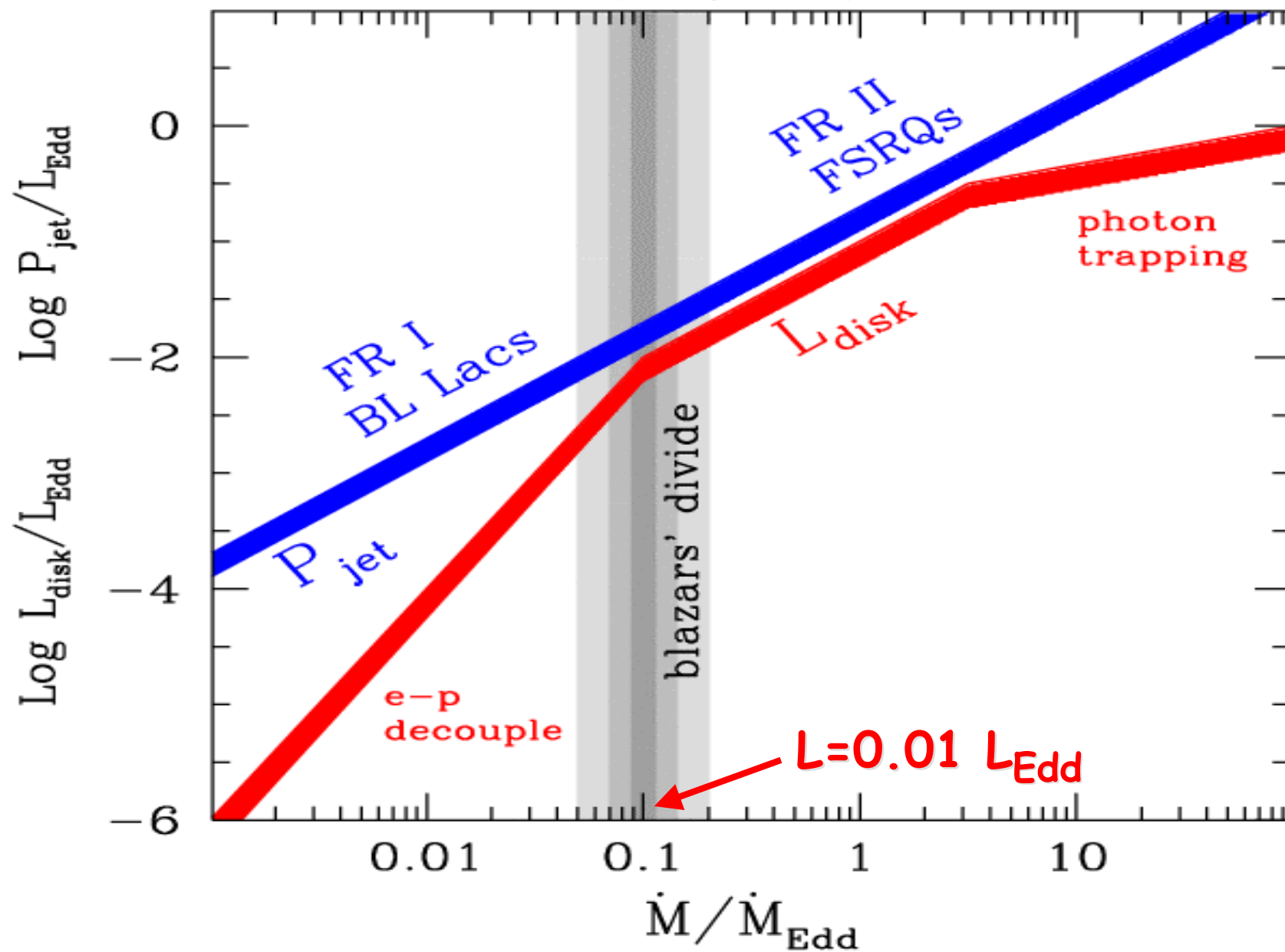


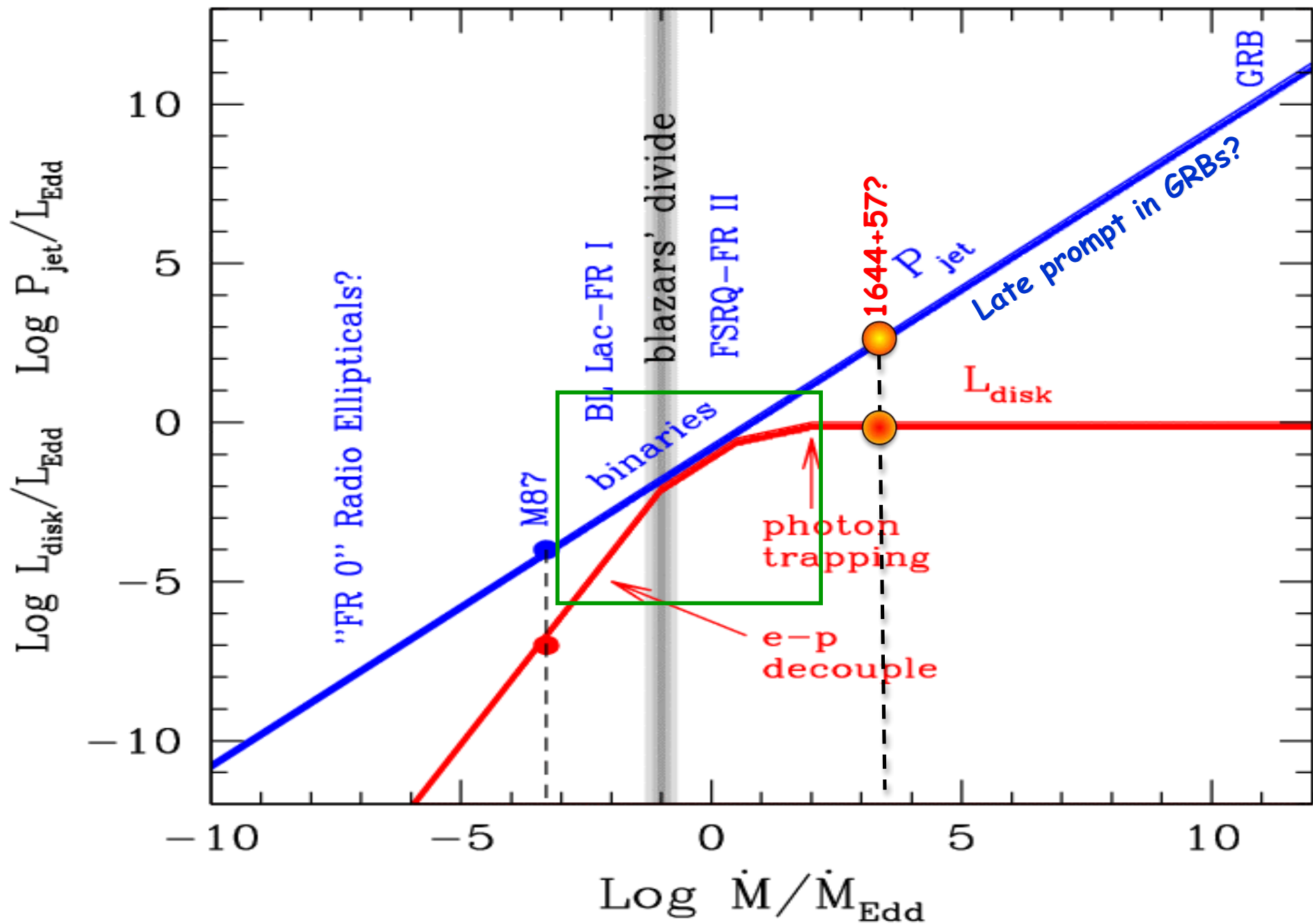
Burrows+ astro-ph/1104.4787



Burrows+ astro-ph/1104.4787

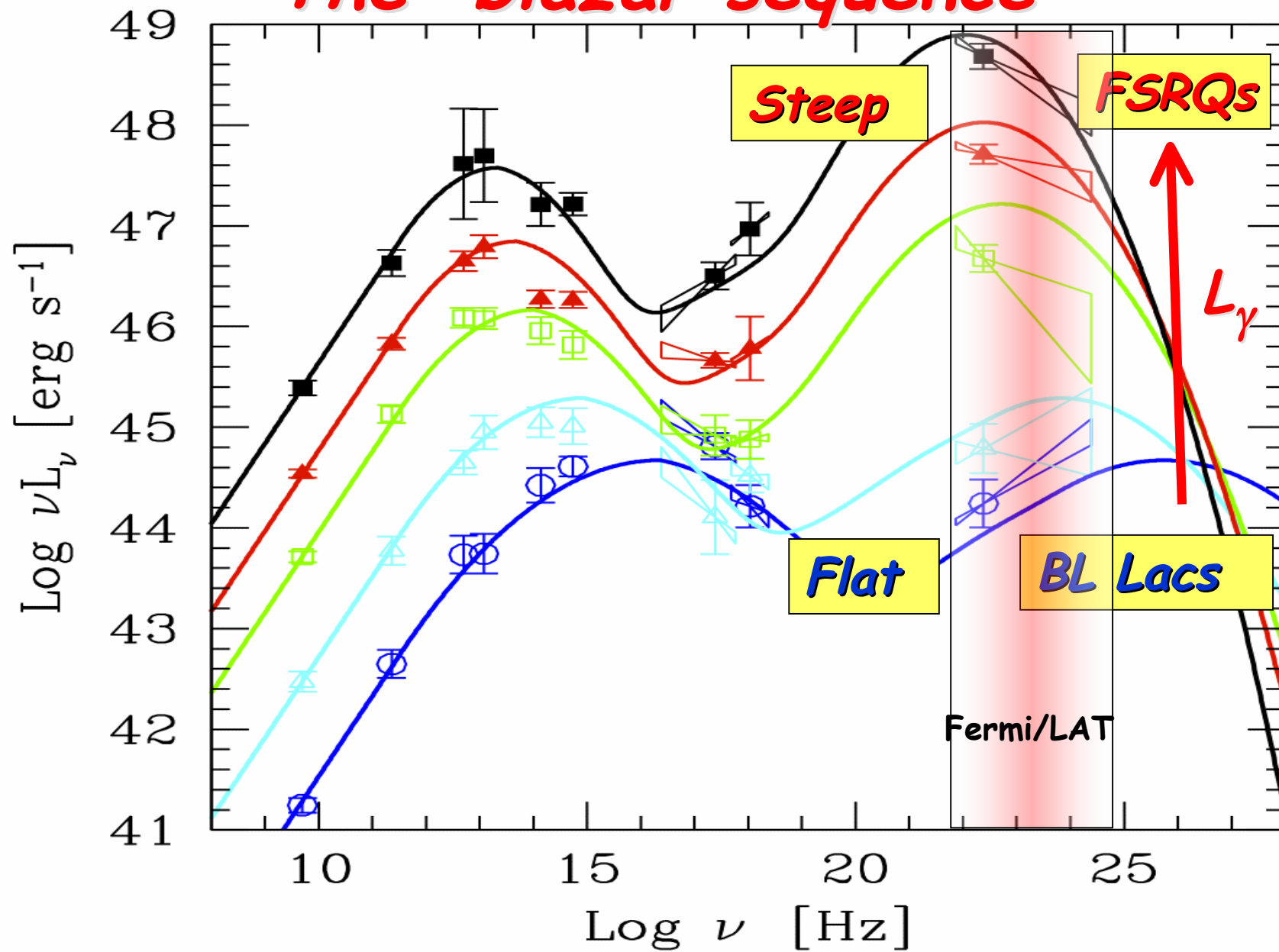
Conclusion







The "blazar sequence"



Fossati et al. 1998; Donato et al. 2001