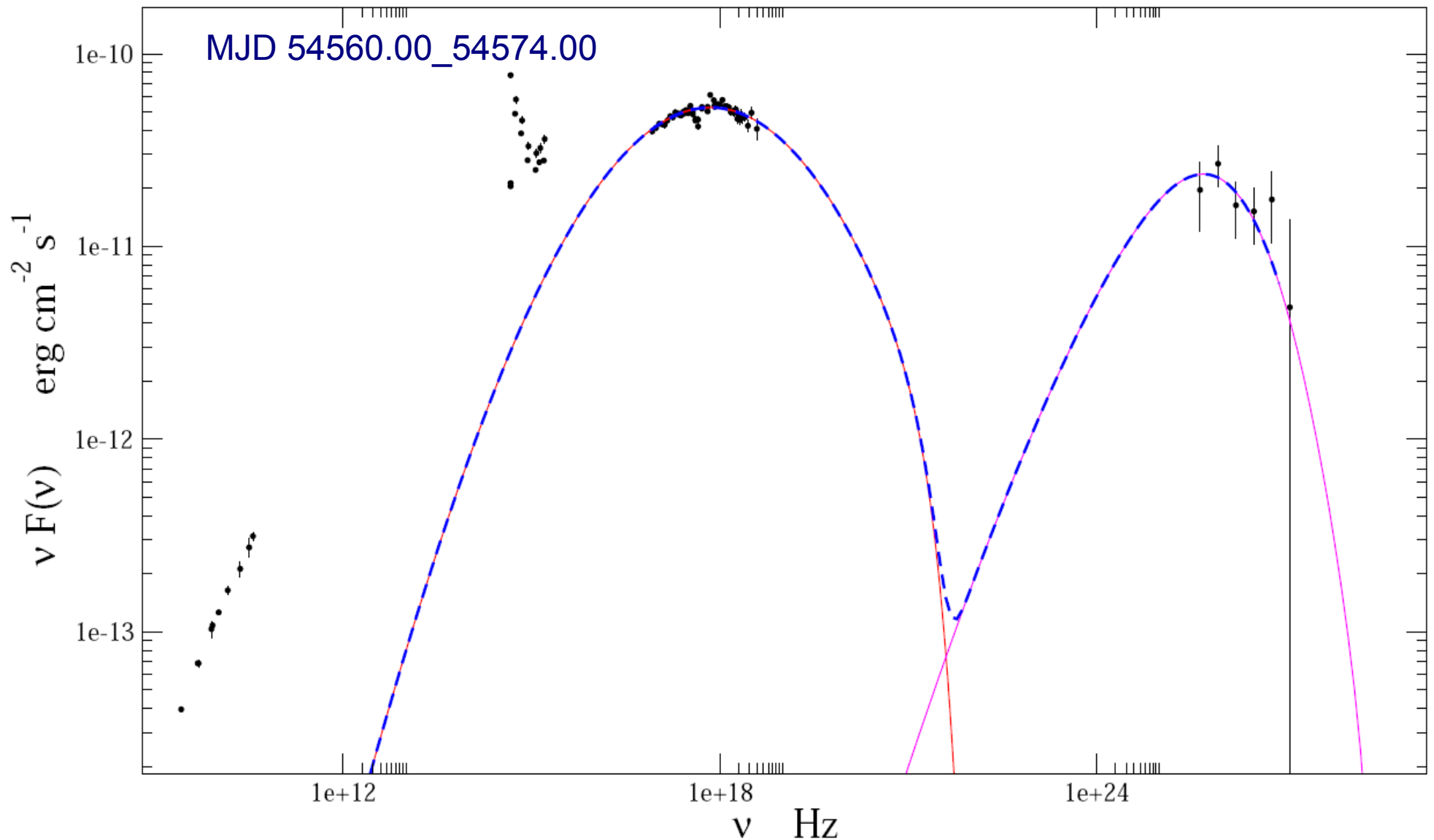


# Mrk 501 2008 MW Campaign SED MODELLING

Andrea Tramacere

# SSC, one zone, leptonic, Log-Parabolic electron distribution



Massaro, Tramacere et al. 2006A&A...448..861M ,  
Tramacere et al. 2009 2009arXiv0901.4124T

# Model Description

Model Parameters:

$$B=0.1 \text{ G}$$

$$d=23$$

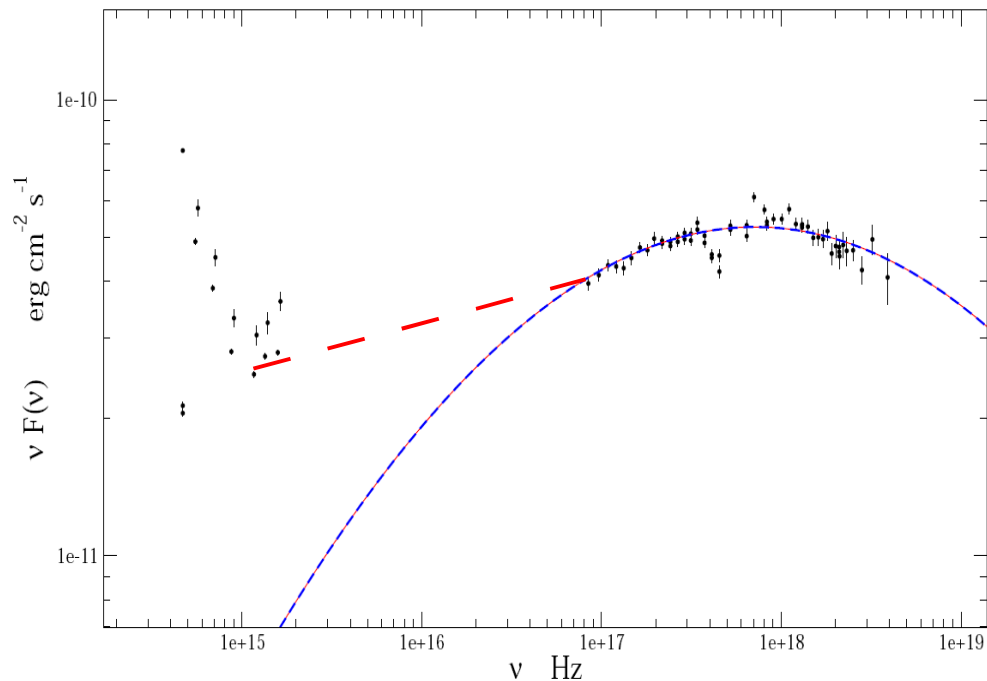
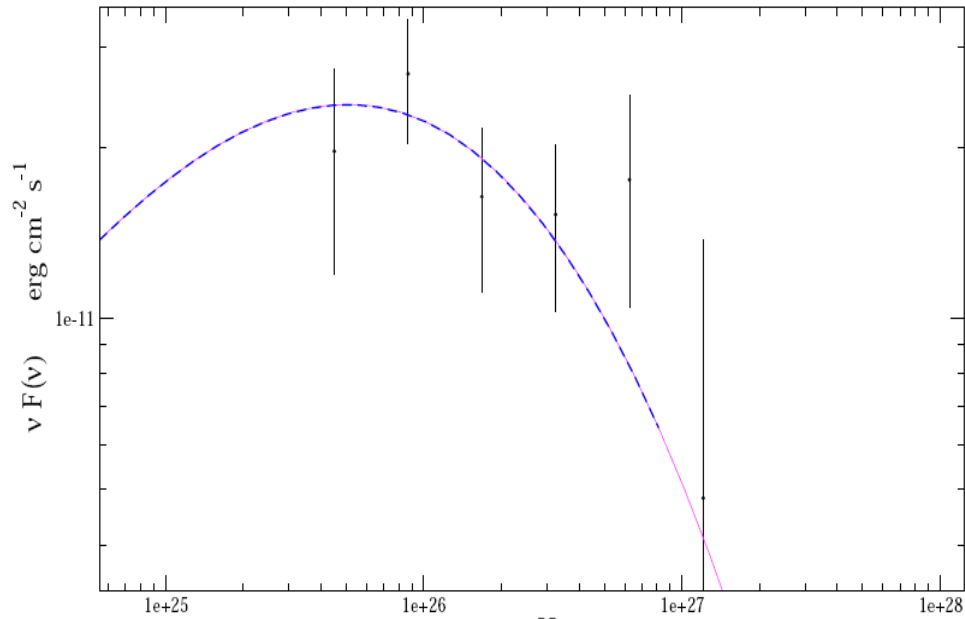
$$r=0.59$$

$$\gamma_p \sim 830$$

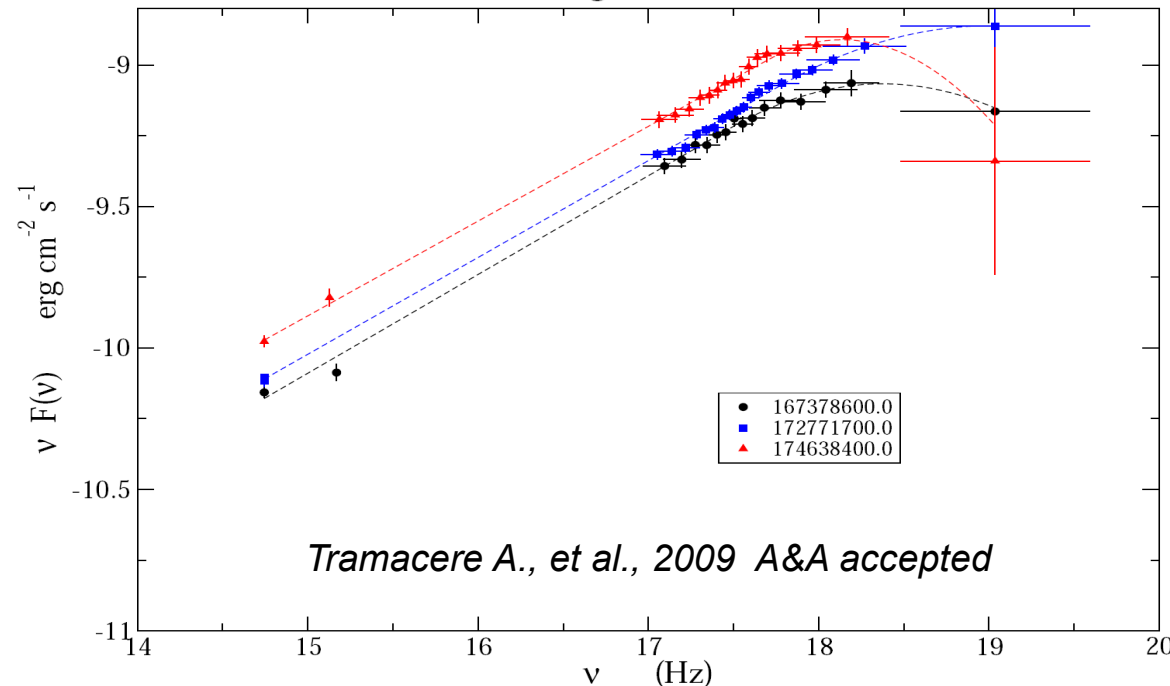
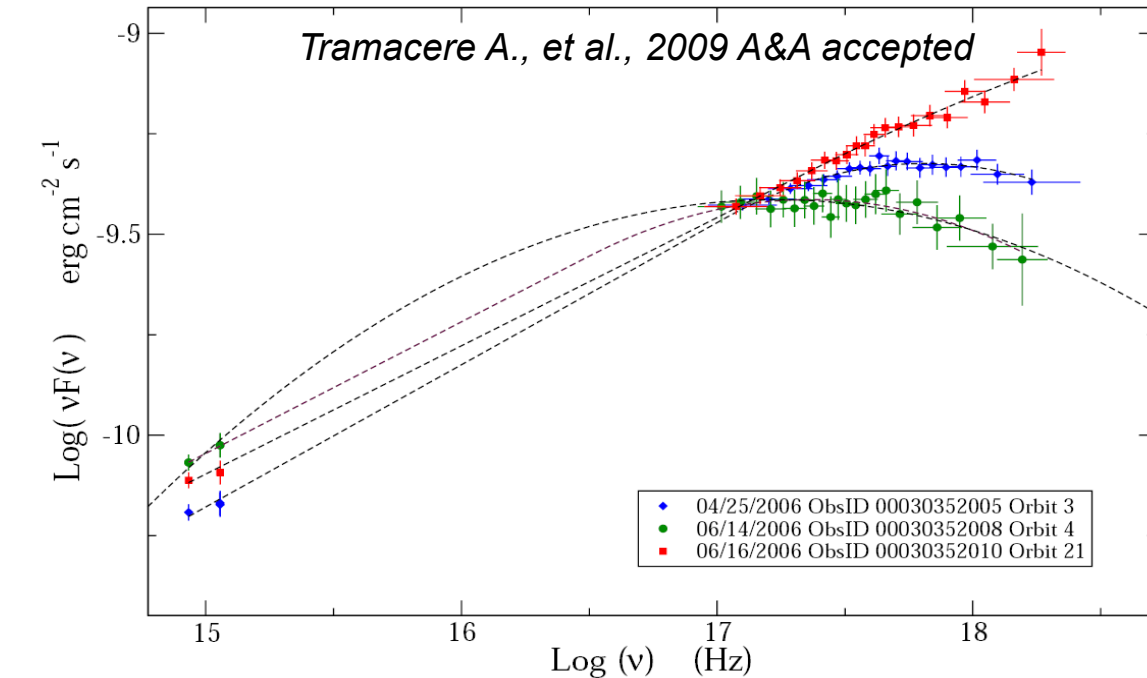
$$\gamma_p \text{ in the SED } \sim N(\gamma) \gamma^3 \sim 2 \times 10^5$$

$$N = \int N(\gamma) d\gamma = 2$$

$$N(\gamma) = K 10^{-\left(r \frac{\text{Log}(\gamma/\tilde{\gamma}_p)}{\tilde{p}}\right)^2}$$



# X to UV connection...for Mrk 421



- we found that joint UVOT-XRT SED can be classified in three categories:
- a) described by a log-parabola(LP)
- b) described by a power law (PL)
- c) described by a spectral law that is power law in the low energy tail turning into a log-parabola in the high energy (LPPL)

$$v F(v) = N (v/v_c)^{-a_v}, \quad v \leq v_c$$

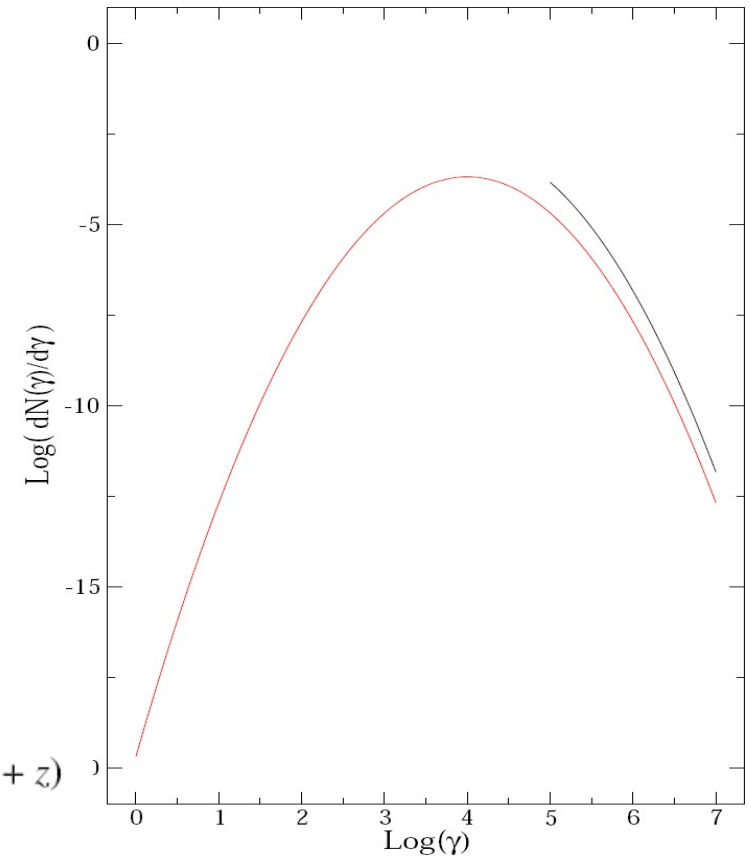
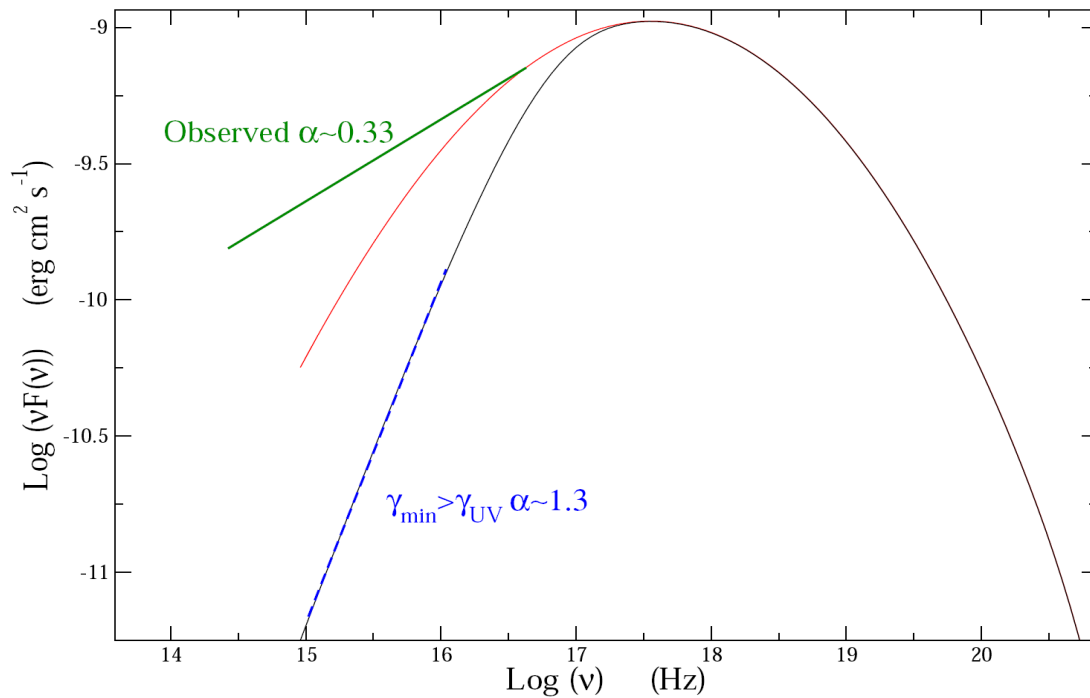
$$v F(v) = N (v/v_c)^{-(a_v+b \log(v/v_c))}, \quad v > v_c$$



$$n(\gamma) = K (\gamma/\gamma_c)^{-s}, \quad \gamma \leq \gamma_c$$

$$n(\gamma) = K (\gamma/\gamma_c)^{-(s+r \text{Log}(\gamma/\gamma_c))}, \quad \gamma > \gamma_c$$

# Investigating the UV-to-Soft-X-ray PL



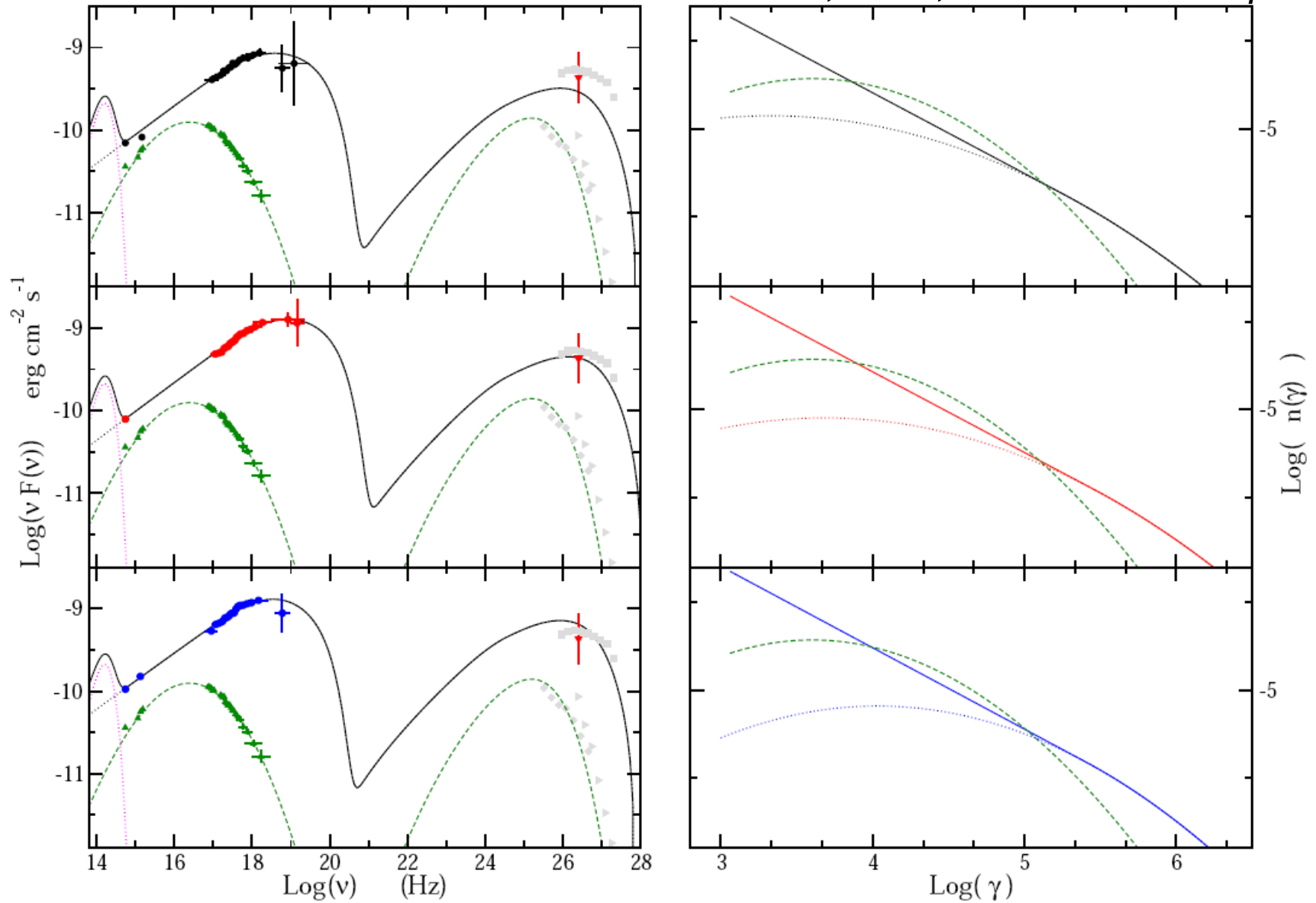
- If UV < LP < X-ray  $\rightarrow \gamma_{\min} \leq \gamma_{UV}$   $10^{15} \text{ Hz} \approx 3.7 \times 10^6 B \delta \gamma_{UV}^2 / (1+z)$
- If PL or LPPL  $\rightarrow \gamma_{\min} > \gamma_{UV}$   $\gamma_{UV} \approx 1.6 \times 10^4 \sqrt{\frac{1+z}{B \delta}}$

but in this case from the Synchrotron theory it is expected  $SED \sim \nu^{4/3}$   
 on the contrary we find  $SED \sim \nu^{[0.25-0.4]}$  that implies  $s \sim [2.2-2.5]$

- The PL feature in the UV-to-soft-X-ray is not compatible with  $\gamma_{\min} > \gamma_{UV} \rightarrow \gamma_{\min} \leq \gamma_{UV}$
- To explain the PL feature observed in the photon spectra we need a power-law tail in the low-energy branch of the electron distribution.

# Mrk 421: SED modelling

*Tramacere A., et al., 2009 A&A accepted*



# Mrk 501 vs Mrk 421

