

# The gamma rays origin of Fermi-LAT blazars, beyond the broad line region?

Wednesday, August 29, 2018 2:15 PM (0:15)

## Abstract content

The gamma-ray emission in broad-line blazars is generally explained as inverse Compton (IC) radiation of relativistic electrons in the jet scattering optical-UV photons from the broad-line region (BLR), the so-called BLR external Compton (EC) scenario. We test this scenario on the Fermi gamma-ray spectra of 106 broad-line blazars detected with the highest significance or largest BLR, by looking for cut-off signatures at high energies compatible with  $\gamma$ - $\gamma$  interactions with BLR photons. We do not find evidence for the expected BLR absorption. For 2/3 of the sources, we can exclude any significant absorption ( $\tau_{\max} < 1$ ), while for the remaining 1/3 the possible absorption is constrained to be 1.5-2 orders of magnitude lower than expected. This result holds also dividing the spectra in high- and low-flux states, and for powerful blazars with large BLR. Only 1 object out of 10 seems compatible with substantial attenuation ( $\tau_{\max} > 5$ ). We conclude that for 9 out of 10 objects, the jet does not interact with BLR photons. Gamma-rays seem either produced outside the BLR most of the time, or the BLR is  $\sim 100 \times$  larger than given by reverberation mapping. This means that EC on BLR photons is disfavoured as the main gamma-ray mechanism, versus IC on IR photons from the torus and without absorption by the BLR, broad-line blazars can become copious emitters above 100 GeV, as demonstrated by 3C 454.3, in this scenario, we will expect to observe this type of sources with the future IATCs instruments as CTA.

**Primary author(s) :** Dr. COSTAMANTE, Luigi (ASI)

**Co-author(s) :** Dr. CUTINI, Sara (INFN Perugia)

**Presenter(s) :** Dr. CUTINI, Sara (INFN Perugia)

**Session Classification :** Gamma Rays

**Track Classification :** Gamma-rays