

Gamma-ray signatures from pair cascades in recombination-line radiation fields

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Multiwavelength campaign for Mrk 501 in July 2014:

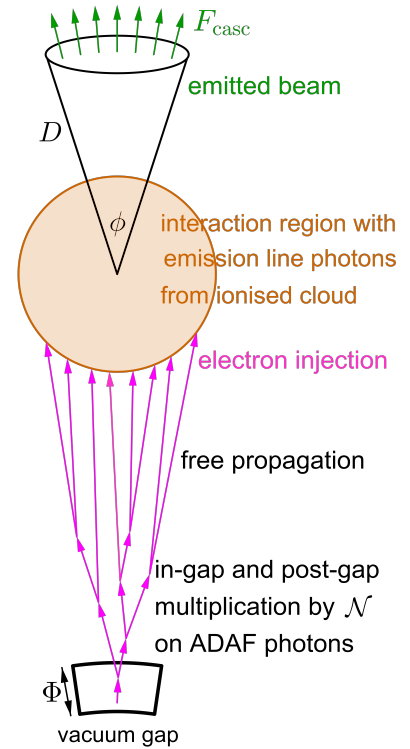
- Hints for additional narrow component at ~ 3 TeV
 - ▶ PL, LP and ELP fit inconsistent at $> 3 \sigma$
 - ▶ Broad + narrow LP preferred over single LP at 4σ
- Talk #79 by Josefa Becerra González



MAGIC Telescopes

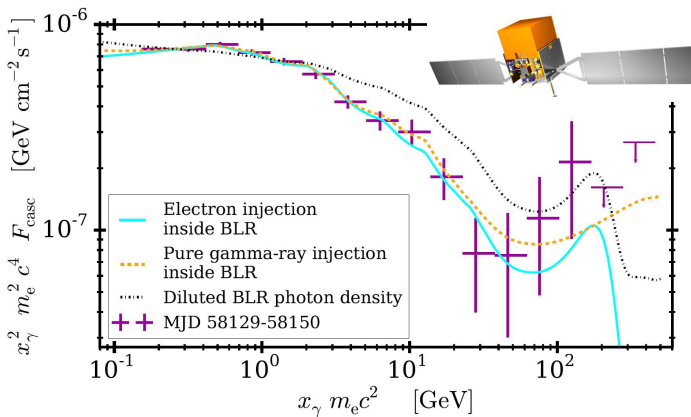
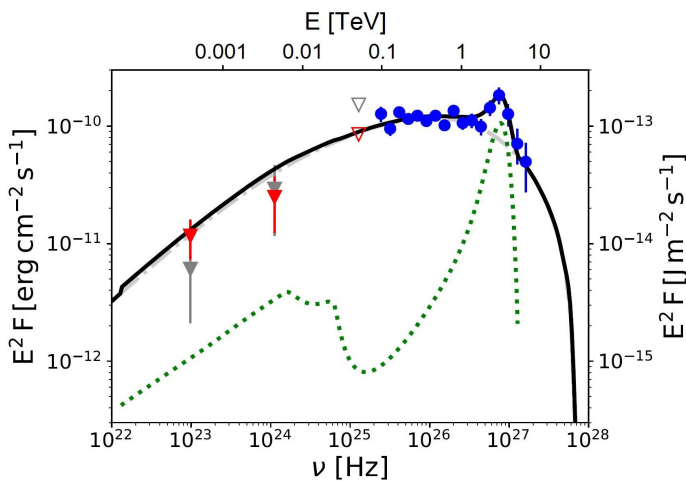
Calls for alternative explanation

- 10^{10} K, low-accreting ADAF:
- ▶ Pair materialisation in vacuum gap and subsequent multiplication by $\mathcal{N}=10^6$ → Electron beam
- ▶ Ionisation of emission line clouds, that reprocess 0.01 of ADAF luminosity



- Electron beam + emission lines → IC pair cascade
- Escaping cascaded gamma rays can account for narrow SED feature

Blue: MAGIC data
 Red and grey: *Fermi*-LAT
 Grey line: SSC emission
 Green dotted line: Cascaded emission
 Black line: SSC + cascaded emission



Dip in SED of 3C 279 from flaring episode in **January 2018**:

- Apply IC pair cascade model similar to Mrk 501 case
- Emission from edge of BLR (cyan and orange) preferred toward outside of BLR (black dash-dotted)

High-precision gamma-ray observations reveal SED substructures beyond the predictions of spherical blob models, but in line with the predictions of IC pair cascade models in external radiation fields.

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