



Contribution ID: 186

Type: not specified

Spectral and Temporal Behaviour of Mrk 501 in Gamma Rays

Tuesday 8 August 2017 17:30 (15 minutes)

The blazar Mrk 501 is a well-known BL-Lac type object emitting very high energy photons interacting with the EBL despite the modest redshift and is highly variable across wavelengths down to timescales of a few minutes at TeV energies. This makes it an excellent laboratory for studying particle acceleration and radiative emission processes in jets through the spectral and temporal properties of the observed emission. It also allows us to constrain the Extragalactic Background Light (EBL) and Lorentz Invariance Violation (LIV). H.E.S.S. has observed Mrk 501 during some of its active states at the highest energies in 2014, triggered by FACT which continuously monitors it, profiling its long-term TeV behaviour as Fermi-LAT does at GeV energies. Here, we present the temporal and spectral behaviour of Mrk 501 at gamma ray energies. We compute the gamma ray power spectral density as well as the energy spectrum for the highest TeV flux state observed by H.E.S.S. and FACT in June 2014 that shows rapid variability and contrast it with the long term average behaviour. We also derive strong constraints on the LIV scale via the non-detection of EBL opacity modifications and from time-of-flight studies from the H.E.S.S. flare data.

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Session Classification: Gamma rays

Track Classification: Gamma rays