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Complex spectro-temporal gamma-ray behaviour of Mrk 501

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The blazar Mrk 501 is a well-known BL-Lac type object, highly variable, on timescales down to a few minutes at TeV energies.
For the study of its gamma-ray emission, we can now fully exploit the complementarity of Fermi-LAT and ground based telescopes. In particular, at TeV energies, the First G-APD Cherenkov Telescope (FACT) performs unbiased monitoring of a small sample of blazars including Mrk 501, providing more than 2400 hours of data on it since 2012. In June 2014, FACT recorded an exceptional outburst during a period of enhanced activity of the source.
Following the alerts, H.E.S.S. also observed the exceptionally high state of Mrk 501 providing the highest sensitivity at minute-timescales.
Profiting from the availablity of temporal and spectral information, on a wide range of temporal and energetic scales, we compute the gamma-ray power spectral density and flux PDFs, characterizing the energy spectrum in different flux states of the source.
We also highlight the negative effects that a biased monitoring can have on the spectral and temporal studies of gamma-ray sources.

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