

## Assessing the flaring behaviour of the Crab pulsar wind nebula system in high-energy ranges

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The Crab system, a bright pulsar wind nebula powered by the young energetic central pulsar PSR B0531+21, has been extensively observed across the electromagnetic spectrum. Its extreme behaviour in the gamma-ray band has been repetitively challenging our understanding of acceleration mechanisms and radiation processes. Studies have purported a flaring emission associated with the synchrotron process originating from the nebula, in energy ranges below a few hundreds of MeV.

By analysing available Fermi-LAT data across a thirteen-year-long monitoring, we study the energy-dependence and time-variability of the observed high-energy flares in energy ranges up to a few GeV. Moreover we attempt to characterise known and candidate flaring epochs, so as to investigate the short and longer term effect on the presumed steady-state emission of the system. In this presentation we shall focus on the example of selected flares showcasing intriguing spectral evolution. We discuss their observational signature in the context of particle acceleration in the Crab

pulsar wind and consider their limitations on distinguishing competing mechanisms.

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