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Implications of observed short-timescale gamma-ray variabilities on blazars jets

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The locations of emission of gamma-ray radiation in active galactic nuclei jet are highly debated and it range from light-hours to a few light-year in quasar jets. The situation is more complex in the case of flat spectrum radio quasars, where the gamma-rays photons above 10 GeV may interact with the UV radiation from broad line region and get absorbed. I will be talking about the recent detections of high energy photons during the minute-scale variability at gamma-ray energies from flat spectrum radio quasars. The minute-scale variability and detection of high energy photons from blazar jets challenges the standard shock-in-jet scenario where gamma-ray emission of blazars is commonly assumed to be associated with shocks traveling down the jet or with the jet formation region. The observed fast variability could either indicate the dissipation of magnetic islands or protons in a collimated beam from the base of the jet encountering the turbulent plasma at the end of the magnetic nozzle.

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