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Understanding the physics of flat-spectrum radio quasars using maultiwavelength observations

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Abstract

Active Galactic Nuclei(AGN) are among the most energetic persistent long-term phenomenon observed in the universe. Flat Spectrum Radio Quasars(FSRQ) are a sub-classification of AGN that make a narrow jet-to-line-of-sight angle to the observer, known as "Blazars". FSRQs show high variability over the entire spectrum, and at different time-scales. While their variability over shorter periods is well studied, variability in observed flux over longer periods in years timescale has not been studied in greater detail. It is believed that the variability in blazars is a characteristic of the jet, but their emission processes are not well-established. γ-rays being extremely energetic, their emission region within the AGN is believed to be close to the base of the jet. Thus, a study of these blazars in the γ-ray wavebands should reveal a wealth of information about the origin and behavior of their jets, and in-turn about the central supermassive black-hole itself.
The launch of the Fermi γ-ray Large Area Space Telescope has enabled studying AGN with an enhanced sensitivity and better sky coverage over earlier telescopes in the γ-ray waveband. Observations from Fermi along with other observatories will provide a unique opportunity to study and understand these energetic phenomenon, as well investigate their observed variability over different time-scales.
The focus of this work is the spectral and temporal variability study of the Fermi-LAT detected source $3C279$ in γ-ray wavelengths over long durations. With Fermi data now available for about five years, the variability of the above mentioned source is studied, and compared with observations in other wavebands. A thorough study could lead to better understanding of physical phenomena that explain the reason behind their long term variability. An extended study involving other classes of AGN can establish AGN behavior in general, as well as contribute ot the unification of AGN dichotomy.