

Manipal Academy of Higher Education

**Impressions@MAHE**

---

University Departments

MAHE Student Work

---

Summer 5-21-2013

## **Spectraland and timing of BL LAC objects using fermi observations**

Ashwini U

Follow this and additional works at: <https://impressions.manipal.edu/maheud>



Part of the [Physical Sciences and Mathematics Commons](#)

---

## Abstract

High energy  $\gamma$ -ray astronomy is an emerging field. Studying the extragalactic  $\gamma$ -ray sources leads to the understanding of the physics involved in these sources that are responsible for the production of high energy  $\gamma$ -rays. Active Galactic Nuclei (AGNs) are among those sources where we can see this kind of high energy emission. Here we have considered BL Lac sources, a subclass of AGNs which are highly variable sources. The emission of these sources is mainly jet dominated. So studying these sources lead to the better understanding of physics of jet.

For our study we have taken a BL Lac source called PKS 2155-304, which is one among those sources which were bright during both EGRET and Fermi time. To understand the physics involved in AGNs, one needs to study both the long term and short term variability of the source. Here we have considered only the long term variability of the source PKS 2155-304 and we analyzed using two different spectral models namely power law and logparabola.

The output of the analysis when plotted showed a deviation from the power law and can be fitted better with logparabola. This significant curvature in the spectra implies that there is a change in the spectral index of the source as flux changes.

These kind of deviations are observed in the spectra of FSRQs, where as BL Lac spectra are well fitted with single power-law. The deviation observed in FSRQs is explained using the absorption in the broad-line-region. Since there is no significant broad-line-region in BL Lacs, the deviation observed for PKS 2155-304 poses many questions on the physical mechanism responsible for this deviation. For this one needs to do further study on the source PKS 2155-304 and also on other BL Lac sources.

The data and tools required for analysis are available in Fermi website.