HEASA2023

Joint spectral analysis of Fermi (LAT-GBM) and Swift Data from the Gamma-Ray Bursts

Contributed Talk //

Gamma-Ray Bursts (GRBs)

Tamador Aldowma //

University of Johannesburg (UJ)

Session 6 //

Thursday, 7 September @ 12:00 SAST

Long duration Gamma-ray bursts (GRBs) are violent deaths of massive stars that emit intense bursts of gamma-rays, providing valuable insights into the most extreme astrophysical phenomena in the universe. Spectral analysis of GRB data is crucial for understanding the underlying emission mechanisms of these sources. In this work, we conduct spectral analysis of prompt emission using the ThreeML software on data from the Fermi (LAT-GBM) and SWIFT telescopes. We cover GRB data collected from 2018 to the present epoch, aiming to extend previous such studies and gain a deeper understanding. The joint fit analysis using ThreeML allows us to combine data from different instruments and extract more robust information about the GRB spectra. We utilize several spectral models, including the Band, power-law, and blackbody models, and a combination of two or more models to obtain the best fit for the observed data. Using the best-fit spectral parameters, we explore the Amati relation, which is a correlation between the intrinsic peak energy $E_{i,peak}$ of the spectrum and total isotropic energy $i,peak$ E over the duration of the burst. Additionally, we investigate the Yonetuko relation, which L_{iso} T_{90} correlates the intrinsic spectral peak energy $E_{i,peak}$ and peak isotropic luminosity.

ADDITIONAL AUTHORS

Initials	Surname	Affiliation
T	Aldowma	University of Johannesburg

Sponsored by the Department of Science and Innovation (DSI) and the National Research Foundation (NRF) through the South African Gamma-Ray Astronomy Programme (SA-GAMMA)