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Spectral and temporal analysis of 16 short Gamma-Ray Bursts detected by the Fermi Space Telescope with known redshift

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Gamma-ray bursts (GRBs) are highly energetic impulses of γ -rays that are classified into two major categories, long and short GRBs. Their distinction lies in their duration (T_{90}) which is calculated from the photon flux accumulation over time. The former lasts for more than 2s whilst the latter lasts for less than 2s with their prompt emission being in the keV to GeV energy band. Short GRBs are typically spectrally hard with spectral index, $\alpha \approx -1$ and the relation between their duration and spectral index depicts a weak inverse correlation. In this study, a sample of sources with known redshift made up of 15 short GRBs detected by *Fermi* Gamma Ray Burst Monitor (GBM) and one intermediate GRB, GRB100816A were selected for spectral studies in the energy range 10 - 900 keV. Most sources in the sample have low energy photons detected by the *Fermi*-Large Area Telescope (LAT) hence LLE photons except for GRB090510A, which is the brightest source in the sample thus has a considerable number of high energy photons with the highest energy photon energy of 29.9 GeV. The counts obtained from the GBM data were binned and their most prominent peaks were utilised for spectral and temporal analysis. Only 12 sources from the sample had prominent peaks including the double peaked GRB111117A. The peaks were fitted using the modified version of the Norris function. The function has the capability to explain the spectral evolution of GRBs which is achieved from the the spectral lags of the function.

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MSc

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