

Constraining the prompt emission region and the ejecta speed of the distant GRB 220101A

GRB 220101A is the most distant gamma-ray burst detected by Fermi-LAT to date ($z = 4.618$). It is a very energetic event, with an equivalent isotropic energy $E_{iso} \sim 3.3 \times 10^{54}$ erg. We jointly analysed Fermi-GBM and LAT data with two analysis chains and obtained consistent results. They reveal a spectral break below 100 MeV in the LAT Low Energy (LLE) range during the prompt emission, associated with fast variability, which suggests that the spectral attenuation is caused by internal opacity to pair creation. Regardless of the nature of the emission processes, we find that the keV and MeV emissions were co-spatially produced above and near the photosphere, with a moderate Lorentz factor $\gamma_{bulk} \sim 100$. We will present this study and compare our findings with other LAT-detected bursts with similar properties.

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