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An attempt to analyse the GRB 221009A using Fermi-GBM data

We analyzed the notable GRB 221009A using Fermi-GBM data, a gamma-ray burst lasting 600 seconds. The event is divided into three distinct phases: the Precursor, Main, and Tail. The Main phase is further subdivided into Main-1 and Main-2 subphases. During the Main-1 phase, we observed an evolution of the low-energy spectral index, with the index shifting from greater than $-2/3$ to less than $-2/3$. We hypothesize that synchrotron radiation occurs first, followed by inverse Compton scattering. However, the Main-2 and Tail phases present a challenge as classical models fail to provide adequate fits. This suggests that these two stages may not represent typical gamma-ray burst prompt emissions and necessitate the development of new models for explanation. Our findings contribute to the understanding of the complex processes during GRB 221009A and emphasize the need for further research in this area.

Summary

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