

A comparative analysis of X-ray lightcurves from X-ray vs GeV/TeV GRB afterglows and its implications.

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Gamma-ray bursts (GRBs) exhibit a rich variety of X-ray lightcurve behaviours, including the presence or absence of plateau/shallow decay phases. There is not yet an agreed consensus about the interpretation of these findings. In this study, we analyse the properties of GRB afterglow X-ray lightcurves, focusing on two distinct populations based on their detection at high and very high energies (HE/VHE) versus X-rays alone. Using available data from the Swift satellite, we systematically compare the X-ray lightcurves (as well as the redshift distributions) of these two GRB populations. Our analysis reveals significant differences in the parameter distributions between the two groups, suggesting simpler lightcurve behaviours for GRBs with HE/VHE emissions, characterised by fewer spectral breaks and distinct slope distributions. These findings support previous research and demonstrate the importance of multi-wavelength observations for better understanding the nature of these emissions. We will also discuss the possible implications of these findings on GRB physics.

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