

Implications of Cutoff observed in Fermi-LAT GRBs spectrum

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The detections of photons above the pair-production threshold require the GRB outflow to be relativistic. The nature of the prompt emission (thermal or non-thermal), the jet composition, and the radius where the dissipation occurs in the outflow to produce the emission, are uncertain. Spectral analyses of the LAT low-energy event (LLE) data of GRBs reveal a cut-off at *less than* 100 MeV. If we interpret this high-energy cutoff arising due to intrinsic opacity to pair production within the source, then it provides an estimate of the bulk Lorentz factor. Further, when supplemented by afterglow observations, this leads to constraints on the emission site of the prompt emission. These constraints, in conjunction with the detailed spectrum, decipher the emission mechanism at work (thermal or non-thermal). Additionally, in the case of thermal mechanism, we can also constrain the efficiency of the prompt emission. From the analyses of joint Fermi-GBM, Fermi-LAT and afterglow data of GRB 190114C, following aforementioned framework, we conclude that the prompt emission is more consistent with produced via photospheric dissipation.

Track

GRBs

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