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Photohadronic origin of sub-TeV afterglow emission from gamma-ray bursts

Content

The detection of GRB 180722B and GRB 190114C in sub-TeV gamma-rays has opened up a new window to probe for the emission mechanisms of high energy radiation from gamma-ray bursts Recently it is argued that the synchrotron and inverse Compton processes are responsible for the production of these high energy gamma-rays during the afterglow. Here, for the first time we demonstrate that the photohadronic scenario, which has been successful in explaining the multi-TeV flaring in high energy blazars, is also applicable for gamma-ray bursts. We show that the afterglow sub-TeV spectra of GRB 190114C and GRB 180720B are due to the interaction of high energy protons with the background photons in the synchrotron self-Compton region and synchrotron region respectively. The nature of the background photon distributions help us to constraint their bulk Lorentz factors.

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