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Synchrotron and synchrotron-self-Compton mechanisms for VHE emission from GRBs

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Recent detection of very high energy (VHE, > 100 GeV) gamma rays from GRBs has opened a possibility to test emission mechanisms late in the afterglow phase. Synchrotron radiation from a decelerating blast wave is a widely accepted model of optical to X-ray afterglow emission from GRBs. GeV gamma rays detected by the Fermi Large Area Telescope (LAT) and the duration of which extends beyond the prompt gamma-ray emission phase, is also compatible with broad features of the afterglow emission. VHE gamma-ray detection therefore can be used for testing the synchrotron-self-Compton (SSC) emission mechanism, which is a natural extension of the synchrotron mechanism. We have developed an SSC model for emission from a decelerating blast wave in various scenarios, such as adiabatic or radiative fireball in constant density or wind-type environment. Here we report on modeling of multiwavelength afterglow data from a few bright GRBs. In the VHE range we compare and contrast SSC emission mechanism with the proton-synchrotron emission mechanism.

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