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Very High Energy Emission from Gamma-Ray Bursts

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Gamma-ray bursts (GRBs), the most powerful sources of gamma rays in the universe, have been detected at energies up to 95 GeV. This energy is at the verge of what is known as the Very High Energy (VHE, above 100 GeV) emission regime. VHE sources are targets for currently running and upcoming ground-based Cherenkov telescopes. It is therefore very important to understand the VHE emission mechanism(s) of GRBs. Synchrotron radiation by electrons accelerated in the external shocks of a GRB blast wave, widely accepted as the mechanism for X-ray to radio afterglow emission, has difficulty to explain >10 GeV emission hours after the GRB trigger. We model VHE emission from interactions of cosmic-rays which are shock-accelerated in the GRB blast wave. We compare this hadronic flux model with leptonic inverse Compton flux model and discuss characteristics which can distinguish them and which could be tested by Cherenkov telescopes.

Collaboration

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