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Synchrotron Modelling of the gamma-ray to optical afterglow of GRB 130427A and expected neutrino flux

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Abstract content
   (Max 300 words)
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GRB 130427A at redshift 0.34 is one of the brightest and most energetic long duration gamma-ray bursts ever detected. A 95 GeV photon, the highest energy ever detected from a GRB, has also been reported by the Large Area Telescope (LAT) on board the Fermi Gamma-ray Space Telescope. Simultaneous observations in the gamma-ray to X-ray to ultraviolet and optical frequencies make this GRB one of the most well-studied in history. We have modelled temporal evolution of flux in different frequencies and broadband spectral energy distribution at different time intervals by using optically thin synchrotron radiation from a relativistic blast wave expanding in a constant density interstellar medium and in a wind-type medium with density gradient. We find that the afterglow of GRB 130427A is better described in case of a wind-type medium. We also calculate expected neutrino flux from this GRB, if protons are accelerated to ultrahigh energies in the blast wave and interact with afterglow photons. Neutrino telescopes which are currently operating and are being planned for future will be able to detect this flux or constrain ultrahigh-energy cosmic-ray acceleration in GRBs.

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