

Search for neutrinos from precursors and afterglows of GRBs

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Gamma ray bursts (GRBs) have long been considered as a possible source of ultra high energy cosmic rays, which makes them a promising neutrino source candidate. Previous IceCube searches for neutrino correlations with GRBs focused on the prompt phase of the GRB and found no significant correlation between neutrino events and the observed GRBs. This motivates us to extend our search beyond the prompt phase. A model-independent search using an unbinned maximum likelihood method is performed to look for muon neutrino correlations with the precursor and afterglow phases of gamma ray bursts and the results are presented. The analysis is applied to a selection of 733 GRBs searching for correlations of neutrino signals with GRB observations separately for the precursor and for the prompt+afterglow emission regions. We obtain the best-fit results for individual GRBs and the final significance for each search is evaluated using binomial tests. Neither of the two searches provides significant evidence of neutrino emission from GRBs during an extended time period up to two weeks before or after the prompt phase of gamma-ray emission. The top 20 results for each search along with the fitted parameters are presented.

Abstract Track

Flash talk, Astroparticle physics

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