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The LHAASO GRB program

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Observation of high energy and very high emission from Gamma Ray Bursts (GRBs) is crucial to study the gigantic explosion and the underline processes. With a large field-of-view and almost full duty cycle, the Water Cherenkov Detector Array (WCDA), a sub-array of the Large High Altitude Air Shower Observatory (LHAASO), is appropriate to monitor the very high energy emission from unpredictable transients such as GRBs. Nevertheless, the main issue for an extensive air shower array is the high energy threshold which limits the horizon of the detector. To address this issue a new trigger method is developed in this article to lower the energy threshold of WCDA for GRB observation. The proposed method significantly improves the detection efficiency of WCDA for gamma-rays around the GRB direction at 10-300 GeV. The sensitivity of the WCDA for GRB detection with the new trigger method is estimated. The achieved sensitivity of the quarter WCDA array above 10 GeV is comparable with that of Fermi-LAT. The GRB sample data collected from WCDA's 1/4 array between June 2019 and December 2019 were selected and analyzed. There is not significant excess from ten selected GRB samples within 2.5 hours before and after the outbreak. According to the assumed energy spectrum and the red shift, we give the upper limit of the integrated current intensity of these GRBs during the T_{90} time.

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