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Prospects for Gamma Ray Bursts detection with LHAASO

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The LHAASO (Large High Altitude Air Shower Observatory) experiment, currently under design, is planned to be installed in the Sichuan Province (China) at 4410 m a.s.l. with the aim
of studying the highest energy gamma-ray sources and cosmic rays in the wide energy range from hundreds of GeV to hundreds of TeV. Among its different components, optimized to study different energy regions, the WCDA (Water Cherenkov Detector Array) will be one of the most important. Four ponds, 150x150 mˆ2 each, will be equipped with 3600 PMTs to detect the Cherenkov light produced by ultra-relativistic particles. Each PMT will monitor a volume cell of 5x5x4 mˆ3.
Data (signal amplitude, with a threshold set at 1 pe level, and arrival time) from each PMT are collected and sent to a DAQ system able to build and record events with all multiplicities starting from a single PMT fired. For small multiplicities, the primary energy for gammas corresponds to
a few GeV, well overlapping the actual satellite detectors, and starting from three PMTs fired a rough arrival direction can be determined, lowering the background and greatly increasing the sensitivity. In this paper, the expected rate and typology of GRBs detectable in follow-up mode with LHAASO has been evaluated using a GRB model (based on available data from Fermi GBM/LAT and Swift), an EBL absorption model and the effective area and angular resolution as a function of energy calculated by means of Monte Carlo simulations for different primary particles
(gamma, h), event multiplicities and zenith angles.

Collaboration

LHAASO

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