

Preliminary Results from the Balloon Flight of the Liquid Xenon Gamma-Ray Imaging Telescope LXeGRIT

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The feasibility of a large volume liquid xenon Compton telescope based on full event imaging in a time projection chamber has been demonstrated with the development of the balloon-borne instrument LXeGRIT. With its 400 cm² sensitive area and 7 cm drift gap, the liquid xenon detector images γ -ray in the energy range from 300 keV to 25 MeV. The precise 3-dimensional localization of γ -ray interactions within the sensitive volume provides excellent background reduction capabilities. Together with a large efficiency of the homogeneous detector, LXeGRIT addresses the primary instrumental limitations encountered in this energy band. Following its engineering tests at balloon altitude in 1997, LXeGRIT has been upgraded with a new trigger and data acquisition system, integrated with the existing readout electronics. Enhanced data transfer capability and on-board data storage was also implemented. LXeGRIT was successfully flown from Ft. Sumner, NM on May 7, 1999. The instrument worked as expected at balloon altitude. The large amount of data gathered during the 9 hrs flight are currently being analyzed. Results from calibration data and preliminary results on the LXeGRIT background rate in the near space environment will be presented.