



Contribution ID : 979

Type : **Poster**

The trigger unit of the space borne gamma-ray burst telescope ECLAIRs

Friday, 6 July 2007 14:45 (0:00)

Abstract content

Gamma-ray bursts (GRB) sign energetic explosions in the Universe, occurring at cosmological distances. Multi-wavelength observations of GRB allow to study their properties and to use them as cosmological tools. In 2011 the space borne gamma-ray telescope ECLAIRs is expected to provide accurate GRB localizations on the sky in near real-time, necessary for ground-based follow-up observations. Led by CEA Saclay, France, the project is currently in its technical design phase. ECLAIRs is optimized to detect highly red-shifted GRB thanks to a 4 keV low energy threshold. A coded mask telescope with a 1024 cm² detection plane of 80x80 CdTe pixels permanently observes a 2 sr sky field. The on-board trigger detects GRB using count-rate increase monitors on multiple timescales and cyclic images. It computes sky images in the 4-50 keV energy range by de-convolving detector plane images with the mask pattern and localizes newly detected sources with <10 arcmin accuracy. While individual GRB photons are available hours later, GRB alerts are transmitted over a VHF network within seconds to ground, in particular to robotic follow-up telescopes, which refine GRB localizations to the level needed by large spectroscopic telescopes. This paper describes the ECLAIRs concept, with emphasis on the GRB triggering scheme.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 3 (OG part 2), pages 1147-1150

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Session Classification : Posters 2 + Coffee

Track Classification : OG.2.4