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Study of time lags in HETE-2 Gamma-Ray Bursts with redshift: search for astrophysical effects and Quantum Gravity signature

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Abstract content

The study of time lags between spikes in Gamma-Ray Bursts light curves in different energy bands as a function of redshift may lead to the detection of effects due to Quantum Gravity. We present an analysis of 15 Gamma- Ray Bursts with measured redshift, detected by the HETE-2 mission between 2001 and 2006 in order to measure time lags related to astrophysical effects and search for Quantum Gravity signature in the framework of an extra- dimension string model. The wavelet transform method is used both for de-noising the light curves and for sharp transition detection. The use of photon-tagged data allows us to consider various energy ranges. Systematic effects due to selection and cuts are evaluated. No significant Quantum Gravity effect is detected from the study of the maxima of the light curves and a lower limit at 95% Confidence Level on the Quantum Gravity scale parameter of 1E15 GeV is set. The analysis of the minima of the light curves leads to a more significant result on the Quantum Gravity scale, to be further investigated with higher statistics.

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. 4 (HE part 1), pages 779-782

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