

Seminario CAPA

Departamento de Física Teórica

“Probing Lorentz Invariance Violation with energy-resolved gamma-ray burst timing”

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Abstract:

Quantum gravity theories suggest that, at energies close to the Planck scale, the structure of space-time may deviate from the smooth picture described by general relativity. One possible observational signature is a tiny energy-dependent delay in the arrival times of photons travelling over cosmological distances.

Gamma-ray bursts are ideal laboratories to search for this effect: they are extremely energetic, rapidly variable, and can be observed up to very high energies. In this seminar, I will present an energy-resolved timing method to test Lorentz Invariance Violation using gamma-ray bursts with known redshift.

The key idea is to model the observed time lag as the combination of two contributions: an intrinsic delay related to the GRB emission process, and a possible propagation-induced delay accumulated during the photon journey through the Universe. I will show the application of this method to 26 Fermi GRBs observed by GBM and LAT, covering the redshift range $0.36 < z < 4.35$.

For a linear sub-luminal LIV correction, we obtain a lower limit for the quantum gravity energy scale: $E_{QG,1} > 3.3 \times 10^{-2} E_{PI}$ at 95% confidence level



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Hora: 12:10 horas

Lugar: Seminario de Física Atómica, Molecular y Nuclear

Online:

<https://cern.zoom.us/j/63768652022?pwd=vYMfB9tfSdbTGh7REWv6EcFPagewXK.1>

