

# Extragalactic background light inhomogeneities and Lorentz-Invariance Violation in gamma-gamma absorption and Compton scattering

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**Abstract.** At energies approaching the Planck energy scale  $10^{19}GeV$ , several quantum-gravity theories predict that familiar concepts such as Lorentz (LIV) symmetry can be broken. Such extreme energies are currently unreachable by experiments on Earth, but for photons traveling over cosmological distances the accumulated deviations from the Lorentz symmetry may be measurable using the Cherenkov Telescope Array (CTA). To study the spectral hardening feature observed in some VHE gamma-ray blazars, we calculate the reduction of the EBL gamma-gamma opacity due to the existence of underdense regions along the line of sight to VHE -gamma ray sources and we compared with the possibility of a LIV signature. Considering the LIV effect, we found that the cosmic opacity for VHE-gamma rays with energy more than 10 TeV can be strongly reduced. I will further discuss the impact of LIV on the Compton scattering process, and how future CTA observations may open an exciting window on studies of the fundamental physics.

**Keywords.** : active, active: blazars, surveys: gamma-rays

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