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Lorentz Invariance Violation in high energy astrophysics

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Several quantum-gravity theories predict that familiar concepts such as Lorentz symmetry can be broken at energies approaching the Planck energy scale.

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). Considering the Lorentz Invariance Violation (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.

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