

Combined search for Lorentz Invariance Violation with Multiple Neutrino Telescopes

The search for Lorentz Invariance Violation (LIV) in the neutrino sector offers a powerful avenue to probe physics beyond the Standard Model, particularly in the context of quantum gravity. High-energy atmospheric neutrinos detected by different neutrino telescopes provide a unique opportunity to test these effects over long baselines and wide energy ranges. This is particularly significant for directional LIV which would manifest as sidereal variations in the event distribution of each detector in a unique form, depending on their location. In this contribution we discuss a combined analysis of multiple neutrino telescopes to enhance sensitivity to LIV coefficients. We also aim to initiate a discussion on the adoption of a common analysis framework across experiments, as well as on the harmonization and comparison of detector-specific systematic uncertainties, which represent a key challenge for robust combined analyses.

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