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Search for effective Lorentz and CPT violation using ZEUS data

Lorentz and CPT symmetry in the quark sector of the Standard Model are studied in the context of an effective field theory using ZEUS $e\pm p$ data. Symmetry-violating effects can lead to time-dependent oscillations of otherwise time-independent observables, including scattering cross sections. An analysis using five years of inclusive neutral-current deep inelastic scattering events corresponding to an integrated HERA luminosity of 372 pb^{-1} at $\sqrt{s} = 318 \text{ GeV}$ has been performed. No evidence for oscillations in sidereal time has been observed within statistical and systematic uncertainties. Constraints, most for the first time, are placed on 42 coefficients parameterising dominant CPT-even dimension-four and CPT-odd dimension-five spin-independent modifications to the propagation and interaction of light quarks.

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