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Gravity, CPT, and the Standard-Model Extension

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Many gravitational phenomena have been well tested with macroscopic matter composed of neutrons, protons, and electrons, but much remains unexplored. Gravitational interactions with other types of matter such as antimatter, charged matter, and matter beyond the first generation remain nearly untested. The gravitational Standard-Model Extension (SME) provides a test framework for the analysis of both traditional matter tests, as well as tests with new types of matter. This talk will provide a review of Lorentz and CPT violation and SME-based proposals for gravitational tests with a focus on novel sensitivities that may be achieved with exotic atoms.

Primary author: TASSON, Jay (St. Olaf College)

Presenter: TASSON, Jay (St. Olaf College)