

Abstract Submitted
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Gravitational probes of string theory and quantum gravity NICOLAS YUNES, Penn State — The Chern-Simons modification to General Relativity is an effective theory that represents both a low-energy limit of all string theories as well as loop quantum gravity. The main modification is the introduction of a parity-violating, Pontryagin term to the Einstein-Hilbert action, which has already been successfully employed to resolve the leptogenesis problem and anisotropies in the CMB. In this talk, I shall discuss gravitational probes of this modification, focusing on solar system experiments and gravitational wave tests. A parameterized post-Newtonian analysis will show that Chern-Simons gravity leads to a correction to gyroscopic precession that could be detected with Gravity Probe B or LAGEOS. A gravitational wave analysis leads to an “amplitude birefringence” effect that could be detected with gravitational wave interferometers, possibly leading to stronger tests of the modified theory. The proposed tests constitute gravitational probes of the quantum structure of spacetime on local and cosmological scales.

Nicolas Yunes
Penn State

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