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Exploring Quantum Corners: How Curved Momentum Space Shapes BTZ Black Holes

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In this talk, I will discuss how quantum features of spacetime can leave imprints on classical gravity within a controlled semiclassical framework. Focusing on (2+1)-dimensional gravity with a negative cosmological constant, I use this lower-dimensional setup as a tractable model to explore the role of curved momentum space, a structure often anticipated in quantum gravity. Starting from a first-order action, I derive an effective configuration-space description where geodesic motion becomes mass-dependent, signaling a mild violation of the equivalence principle. Coupling this modified matter sector to Einstein gravity, I then construct a perturbative correction to the BTZ black hole solution. The resulting ADM mass, Hawking temperature, and entropy acquire explicit corrections governed by the momentum-space geometry. These findings provide a concrete illustration of how Planck-scale kinematic effects can backreact on classical spacetimes, offering new insights into semiclassical aspects of gravity.

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