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Planckian discreteness in cosmology: Brownian motion of dark matter particles

Friday, 12 July 2024 18:00 (30 minutes)

Quantum gravity has yet remained elusive from an observational standpoint. In this talk, I will discuss Swerves, a proposal within quantum gravity phenomenology that predicts testable effects in cosmological data. Motivated by considerations in Causal Set Theory, a discrete approach to quantum gravity, we have formulated the covariant Brownian motion of free particles around their geodesics. At the level of the Fokker-Planck equation, this approach provides the unique generally covariant extension to the Boltzmann equation for free particles. When applied to dark matter particles, it results in dynamical warming at late times, which suppresses the matter power spectrum at small scales. Thus, the model shows potential for alleviating the S_8 tension.

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