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Distinguishing bounce and inflation via quantum signatures from cosmic microwave background

Monday, 8 July 2024 18:00 (30 minutes)

Cosmological inflation is a popular paradigm for understanding Cosmic Microwave Background Radiation (CMBR); however, it faces many conceptual challenges. An alternative mechanism to inflation for generating an almost scale-invariant spectrum of perturbations is a *bouncing cosmology* with an initial matter-dominated contraction phase, during which the modes corresponding to currently observed scales exited the Hubble radius. Bouncing cosmology avoids the initial singularity but has fine-tuning problems. Taking an *agnostic view* of the two early-universe paradigms, we propose a quantum measure — Dynamical Fidelity Susceptibility (DFS) of CMBR — that distinguishes the two scenarios. Taking two simple models with the same power-spectrum, we explicitly show that DFS behaves differently for the two scenarios. We discuss the possibility of using DFS as a distinguisher in the upcoming space missions. [Ref: arXiv:2405.08543]

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