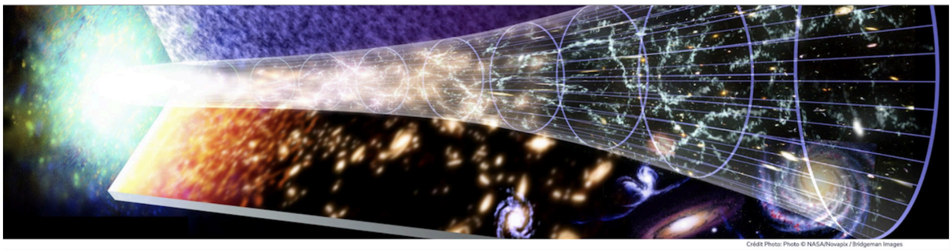

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Testing Entropic Explanations of Cosmic Acceleration with DESI and Supernovae

mardi 2 juin 2026 11:00 (30 minutes)

The accelerated expansion of the Universe is usually described by a cosmological constant, Λ. An interesting alternative idea is entropic cosmology, where the entropy associated with the cosmic horizon effectively contributes to (or mimics) dark energy. In this talk, I will compare two commonly discussed routes: (i) holographic dark energy (HDE), where the dark-energy density is tied to a horizon length scale, and (ii) gravity-thermodynamics (GT) models, where the expansion equations are modified by applying the first law of thermodynamics at the horizon.

Using late-time observations of Type Ia supernovae (Pantheon+ and DESy5) together with baryon acoustic oscillation measurements from DESI, we carry out Bayesian parameter estimation and model comparison for generalized entropy deformations motivated by non-standard (Barrow/Tsallis-type) horizon entropies. We find that HDE provides an excellent fit and is statistically competitive with ΛCDM across data combinations, with an effective equation of state consistent with a mild, quintessence-like evolution.

In contrast, the GT implementations are strongly disfavoured by Bayesian evidence for essentially all data combinations. We then extend the GT framework to broader three- and four-parameter generalized entropy families (which include several popular non-extensive entropies as special limits) and update the analysis with the latest DESI release. The data prefer the standard Bekenstein-Hawking area law, yielding a late-time expansion that is close to ΛCDM. We also find that the three-parameter entropy description is sufficient and is preferred over the four-parameter extension.

Auteur: M. TYAGI, Udit Kumar (IISER Thiruvananthapuram, Kerala, India)

Co-auteurs: Dr HARIDASU, Sandeep (SISSA, Trieste, Italy); BASAK, Soumen (IISER Thiruvananthapuram, Kerala, India)

Orateur: BASAK, Soumen (IISER Thiruvananthapuram, Kerala, India)

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