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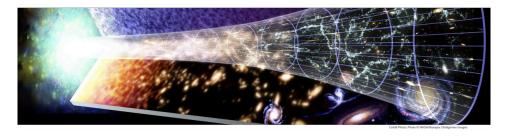
ID de Contribution: **17**   Type: **Non spécifié**

CLONES: Digital Twins of the Local Universe for Bias-Free Inference

mardi 15 avril 2025 11:50 (25 minutes)

Understanding dark matter and dark energy, which make up 95% of the Universe, requires cosmological surveys to achieve percent-level precision. Yet, this precision reveals tensions between observations and the standard cosmological model, potentially stemming from systematic biases. CLONES (Constrained LOcal & Nesting Environment Simulations) are digital twins of the local Universe designed to replicate our cosmic environment and tackle these challenges. Highlighting key cosmological tensions and showcasing an example study of these CLONES will demonstrate how they can offer a powerful framework for bias-free analyses, advancing our understanding of galaxy evolution and large-scale structure formation.

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