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Consistency of Tachyacoustic Cosmology with de Sitter Swampland Conjectures

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Recent studies show that there is tension between the de Sitter swampland conjectures proposed by Obeid, et al. and inflationary cosmology. In this paper, we consider an alternative to inflation, 'tachyacoustic' cosmology, in light of swampland conjectures. In tachyacoustic models, primordial perturbations are generated by a period of superluminal sound speed instead of accelerating expansion. We show that realizations of tachyacoustic Lagrangians can be consistent with the de Sitter swampland conjectures, and therefore can in principle be consistent with a UV-complete theory. We derive a general condition for models with c_S>1 to be consistent with swampland conjectures.

Summary

Authors: KINNEY, William (Univ. at Buffalo, SUNY); LIN, Wei-Chen (Univ. at Buffalo, SUNY)Presenter: LIN, Wei-Chen (Univ. at Buffalo, SUNY)Session Classification: Theoretical Developments