

Abstract Submitted
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Inflation with Pre-inflationary Radiation Dominated Era¹ TAYLOR ORDINES, PAUL ANDERSON, ERIC CARLSON, BRADLEY HICKS, Wake Forest University — We argue that if from the viewpoint of semiclassical gravity the Universe began with zero size, then there is a preferred initial vacuum state and that if the quantum fields are in any other homogeneous and isotropic state, then before inflation began the Universe, to a good approximation, was radiation dominated. We then study the effects of a pre-inflationary radiation dominated era that smoothly evolves into an inflationary era by numerically solving the mode equation for a massless, minimally coupled scalar field. We model this transition with a combination of classical radiation and a cosmological constant with the Universe asymptotically approaching de Sitter space. The resulting late-time power spectrum is free of enhancements at all scales, oscillating with peaks that never exceed the Bunch-Davies value. Comparisons with previous results in models in which the Universe began with a radiation dominated phase will be made.

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