

Abstract Submitted  
for the APR06 Meeting of  
The American Physical Society

**Generating Scale-invariant Power Spectrum in String Gas Cosmology** ALI NAYERI, Department of Physics, Harvard University, ROBERT BRANDENBERGER, Department of Physics, McGill University, CUMRUN VAFA, Department of Physics, Harvard University — We study the generation of cosmological perturbations during the Hagedorn phase of string gas cosmology. Using tools of string thermodynamics we provide indications that it may be possible to obtain a nearly scale-invariant spectrum of cosmological fluctuations on scales which are of cosmological interest today. In our cosmological scenario, the early Hagedorn phase of string gas cosmology goes over smoothly into the radiation-dominated phase of standard cosmology, without having a period of cosmological inflation. Furthermore, we find that string thermodynamics implies that the fluctuations are Gaussian, and that the spectrum of tensor perturbations will exhibit a scale-invariant spectrum as well. We contrast the predictions of string gas cosmology in the Hagedorn phase with that of scalar field driven inflation, and comment on the possibility of observationally distinguishing between the two scenarios in future experiments.

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Date submitted: 23 Jan 2006

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