

Tachyon Logamediate Inflation on DGP Braneworld Gravity

By: Arvin Ravanpak and Golnaz Farpour Fadakar
Vali-e-Asr university of Rafsanjan, Iran

Introduction

- Inflation is a short period of a very rapidly accelerated expansion of the very early Universe.
- Inflaton field is a hypothetical scalar field that drives inflation.
- Tachyon field is a scalar field that can play the role of the inflaton field.
- Logamediate inflation is an inflationary model in which the scale factor evolves as $a(t) = \exp(A(\ln t)^\lambda)$.
- Extra dimensional cosmological models in which our 4D Universe is embedded as a brane in a higher dimensional bulk can explain some of the important cosmological problems.
- DGP braneworld model in which the 5D bulk is Minkowskian can explain the late time acceleration of the Universe without any dark energy component.
- Tachyon scalar field, logamediate inflation and braneworld cosmology have their roots in string theory.

The Model

- We investigate a logamediate tachyonic inflationary model in the context of DGP cosmology.

- Fundamental equations:
$$\begin{cases} (\sqrt{3}\mu H + \sqrt{\rho_0/2})^2 \approx V \leftrightarrow \text{Friedmann equation} \\ V' \approx -3HV\dot{\phi} \leftrightarrow \text{Tachyon equation of motion} \end{cases}$$

- We will show that some important perturbation parameters of the model are in good agreement with observational data from Planck 2018.

- Perturbation parameters:
$$\begin{cases} r = P_g/P_R \leftrightarrow \text{Tensor to scalar ratio} \\ n_s = 1 + d \ln P_R / d \ln k \leftrightarrow \text{Scalar spectral index} \end{cases}$$

The Results

- Reference:
Planck 2018 results.
VI. Cosmological parameters
Accepted to be published in
"Astronomy & Astrophysics"

