

2 Wormholes and Large Field Inflation

Abstract:

One of the major challenges in string cosmology consists in constructing a fully consistent model of large field inflation with measurable tensor modes. Such models are often constrained by gravitational corrections that destroy the inflationary plateau. One of those gravitational corrections comes from axionic wormholes, which are solutions the Euclidean Einstein equations coupled to a scalar field (axion). In string theory the parameters appearing in the lagrangian for the axion depend on other, heavier scalar fields, which might alter the present understanding of axionic wormholes. In this project, the student will investigate such string-inspired scenarios and construct the corresponding wormhole solutions. The results of these computations will for sure have something to say about the viability of large field inflation in our universe.

Plan of the project:

1. Study of Axionic Wormholes
2. Study of large field inflationart models
3. Investigation of the axionic wormholes with moduli-dependent parameters

Techniques/Tools used: Mathematica, Paper & Pen