

Contributed Talk

Name: Javier Olmedo

Position: Post-Doc/Research Fellow

Affiliation: Universidad de Granada

Title: Inhomogeneous polarized Gowdy model and inflation

Abstract: In this talk I will show that polarized Gowdy cosmologies on the three torus coupled to a massive scalar field are relevant physical inhomogeneous cosmological models. They admit a simple splitting between homogeneous and inhomogeneous sectors after a suitable gauge fixing. Besides, there are regimes of physical interest where we recover a linear dynamics of nonperturbative inhomogeneities, despite the metric is fully inhomogeneous. Inhomogeneities can be expressed in Fourier modes and written as linear combinations of a basis of orthonormal complex solutions to the equations of motion, with coefficients that turn out to be an infinite collection of constants of motion. We argue that this model can help us to understand nonperturbative inhomogeneous early universes dominated by the kinetic energy of an inflaton at early times that eventually reach a slow-roll regime with a mean scale factor that expands nearly exponentially at late times, reaching an isotropic and homogeneous geometry.