

# Seminario

## Departamento de Física Teórica

### *“Adaptive Mesh Refinement Simulations of Cosmological Scalar Fields”*

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#### **Abstract:**

Over the past 15 months that I have had the pleasure to be part of the Departamento de Física Teórica I continued my broad research on adaptive mesh refinement (AMR) simulations of cosmological scalar fields. In this seminar talk I will highlight the main scientific results that are the product of my stay at the Universidad de Zaragoza. This includes a new numerical method for ultra-deep zoom-in simulations of cosmological structure formation with fuzzy dark matter allowing numerical analyses of Milky Way-sized halos. Additionally, I will present preliminary results of cosmological structure formation suppression in scenarios where fuzzy dark matter is considered as an admixture to cold dark matter. The same numerical techniques are utilized for gravitational collapse simulations of the inflaton field in the post-inflationary, matter dominated Universe. Finally, I will highlight numerical results of QCD axion evolution assuming PQ-symmetry breaking after inflation using AMR techniques to better resolve axion strings and axitons for increasingly realistic simulations.

**Fecha:** Jueves 16 de diciembre de 2021

**Hora:** 12:00

**Lugar:** Seminario de Física Atómica, Molecular y Nuclear