



UNIVERSITÀ
degli STUDI
di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN FISICA
CICLO XLI A.A. 2025/2026

Cosmological inflation and large-scale structures

CFU 3

Teaching staff

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Reception hours: Mon 14-18

Program of the course:

Quick review on Big Bang cosmology: FRLW metric, Friedman equations, Big Bang Nucleosynthesis, Recombination.

Horizon and Flatness problems.

The inflationary paradigm.

The scalar field driving the expansion: the inflaton.

Implications on inflation cosmology.

Observables in large scale structures perturbations and in the CMB anisotropies.

Latest constraints on inflationary observables.

Bibliography:

- Hu, W., Dodelson S., 2002, Cosmic Microwave Background Anisotropies, <https://www.annualreviews.org/doi/pdf/10.1146/annurev.astro.40.060401.093926>
- Dodelson - Modern Cosmology, Elsevier
- Carroll, S. 1998, Quintessence and the Rest of the World, <https://arxiv.org/abs/astro-ph/9806099>
- slides provided by the teacher