

Corso seminariale anno accademico 2022/23

Semestre: II

TITOLO CORSO: Cosmology

DOCENTE: Riccardo Murgia (Research Assistant Professor (RTDa) GSSI & INFN)

Corso seminariale per la laurea: Magistrale

Numero CFU: 3

Programma del corso: (24 ore di attività, 3 CFU)

1. Cosmological principle and Robertson-Walker metric.
2. Redshift and distances in cosmology. Hubble law.
3. The main components of the Universe: baryons, dark matter, dark energy, neutrinos and radiation.
4. Friedmann equations from Einstein Equations. Main solutions.
5. The thermal history of the universe: inflation, decoupling, primordial nucleosynthesis, hydrogen recombination, matter-radiation equality, and matter-dark energy equality.
6. Dark matter abundance (hot and cold relics).
7. Cosmological perturbations: Formation, evolution and statistical description of the cosmic microwave background (CMB) and large-scale structure (LSS) of the universe.
8. Concordance and discordance in cosmology: cosmic tensions and anomalies.

Modalità erogazione: lezioni frontali (lavagna e slides)

Testi di riferimento:

- Gravitation and Cosmology: Principles and Applications of the General Theory of Relativity (Steven Weinberg)
- Modern Cosmology (Scott Dodelson)
- Galaxy Formation and Evolution (Mo, van den Bosch, White)

Modalità di svolgimento dell'esame:

lettura di un articolo scientifico e presentazione/discussione finale

