

Cosmology (M24)

Professor E. Pajer

This course discusses what we know (and don't know) about the evolution of our universe, from inflationary quantum fluctuations in the first fraction of a second to the formation of galaxies and structures today. It also seeks to illustrate how cosmology can serve as a uniquely powerful laboratory for understanding fundamental physics.

In detail, the course will cover the following topics:

- Geometry and dynamics of our Universe
- Inflation
- Thermal history
- Cosmological perturbation theory
- Structure formation
- Cosmic microwave background basics
- Initial conditions from inflation

Prerequisites

Although the course is intended to be as self contained as possible, knowledge of relativity, quantum mechanics and statistical mechanics will be useful. Following general relativity and quantum field theory at the same time as cosmology will lead to a deeper understanding of some of the material covered.

Literature

1. D. Baumann, Cosmology
2. S. Dodelson, Modern Cosmology
3. E. Kolb and M. Turner, The Early Universe
4. S. Weinberg, Cosmology

Additional support

Four examples sheets will be provided and four associated examples classes will be given. There will be a one-hour revision class in the Easter Term.