Advanced Cosmology (L24)
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This course will take forward at much greater depth some of the topics in modern cosmology covered in the Michaelmas Term *Cosmology* course. The prediction from fundamental theory for the statistical properties of the primordial perturbations remains the key area of confrontation with cosmological observations, both from large-scale structure and the cosmic microwave background (CMB). This course will develop the mathematical tools and physical understanding necessary for research in this very active area.

**Cosmic microwave background**

- Statistics of random fields
- Relativistic kinetic theory
- The Boltzmann equation
- The CMB temperature power spectrum
- Photon scattering and diffusion
- Primordial gravitational waves and the CMB
- CMB Polarization

**Inflationary theory and Large-Scale Structure**

- Primordial non-Gaussianities
- Effective field theory of inflation
- CMB bispectrum and optimal estimators
- Modelling late time non-linearities in large-scale structure
- Effective field theory of large-scale structure
- Tracers of large-scale structure and the peak formalism

**Pre-requisites**

Material from the Michaelmas term *Cosmology* is essential. Familiarity with introductory Quantum Field Theory and General Relativity is recommended.

**Literature**

**Textbooks**


**Useful references**


**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.