Advanced Cosmology 2015

M2 NPAC: 4 lectures by Hervé Dole

Detailed Plan

Welcome

TD 1

- Exo 1: Why is the night sky dark ?
- Exo 2: Computing the density contrast
- Exo 3: Why is there a problem in naïve galaxy formation ?

Introduction slides on cosmology and this course

Chapter 1: Probes of inhomogeneities: from P(k) to galaxies

1. 2-pt correlation function of galaxies
2. P(k) and 2-pt correlation function
3. Angular correlation function
4. Galaxy-matter bias
5. BAOs

Chapter 2: Cosmic Microwave Background

1. Angular power spectrum on the sphere: Cl
2. An estimator of Cl – gaussianity of DT/T and alms
3. Variance and Cl and "Cosmic variance"
4. CMB Temperature
5. Cross-correlations
6. What does l mean ?

Details on CMB, polarization and cosmological parameters

Seminar on Planck results

TD 2

- Exo: CMB & BAOs

Chapter 3: Introduction to Galaxy Formation

1. Collapsing haloes (Mo & White)
2. Cooling of structures
    a. Dynamical time
    b. Cooling time
        i. Definition
        ii. The cooling function
3. Conditions for collapse
    a. Conditions
    b. Implications
    c. Numbers
4. t_{dyn} vs t_{cool}: why galaxies are what they are
5. Overcooling problem
6. Role and problem of H_2

Also: visit of the IAS calibration station (Station d'étalonnage)