

Experimental Cosmology Exam

Student's name:

NOTE: Lecture notes can used.

Q1: BASIC COSMOLOGICAL CONCEPTS

1. Define what the Lambda-CDM model means. Present the main cosmological parameters.
2. Discuss the main problems of the Big Bang model that lead to inflationary theory
3. Describe why CMB power spectra in temperature and polarisation can be used to constraint cosmological parameters

Q2: DEFINING A CMB EXPERIMENT

Consider a CMB instrument dedicated to the observation of CMB polarisation anisotropies at large angular scales between multipoles 2 and 300.

1. Define a brief scientific case for this instrument including a sketched figure.
 2. Compute the minimum resolution you need (size of the smallest scale you will be able to observe) ? Indicate the typical angular size of the patch of the sky you need to observe.
 3. Where should you place your instrument (ground based, balloon, or satellite)? . Why?.
 4. Describe an instrumental setup adapted to your scientific case (choice of technology, number of detectors, frequency range). Discuss your choice.
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