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CMB spectral distortions: the COSMO experiment

Thursday, 8 July 2021 17:18 (18 minutes)

The COSmic Monopole Observer (COSMO) is an experiment to measure spectral distortions of the Cosmic Microwave Background (CMB). Deviations from a pure blackbody spectrum are expected at low level (< 1 ppm) due to several astrophysical and cosmological phenomena, and promise to provide important independent information on the early and late phases of the universe. They have never been detected due to the extreme accuracy required, the best upper limits being still those from the COBE-FIRAS mission. COSMO is based on a cryogenic differential Fourier Transform Spectrometer, measuring the spectral brightness difference between the sky and an accurate cryogenic blackbody. The first implementation of COSMO, funded by the Italian PRIN and PNRA programs (see http://cosmo.roma1.infn.it for details), will operate from the Concordia station at Dome-C, in Antarctica, and will take advantage of a fast sky-dip technique to get rid of atmospheric emission and its fluctuations, separating them from the monopole component of the sky brightness. In the talk we will describe the instrument design, its capabilities, the current status, and its subsequent implementation in a balloon-flight, which has been studied within the COSMOS program of the Italian Space Agency.

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