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## CMB spectral distortions measurements at Dome-C: the antenna system of COSMO

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In this work I present the design and forecasted performance of the multimoded feed-horns system of the Cosmic Monopole Observer (COSMO). COSMO is a pathfinder experiment that aims at measuring the isotropic  $y$ -type spectral distortion of the Cosmic Microwave Background from Dome-C, Antarctica. The current upper limit on the  $y$ -distortion is  $< 10^{-5}$  (COBE-FIRAS and TRIS).

COSMO exploits a cryogenic Martin-Puplett Fourier Transform Spectrometer to measure the difference in brightness between the radiation collected from the sky and from an internal, cryogenic reference blackbody. To reduce the atmospheric contribution, fast sky-dips at varying elevation are performed through a spinning wedge mirror while the interferogram is scanned by fast, low-noise Kinetic Inductance detectors.

The radiation is coupled to the detectors by two arrays of nine smooth-walled feed-horns working in the 120 – 180 GHz and 210 – 300 GHz range, respectively. The feed-horns are multimoded to provide a greater throughput and a higher signal-to-noise level than a traditional single-mode receiver, thus increasing the instrumental sensitivity without extending the focal plane.

The antenna design is a trade-off between the multimode requirement on the antenna waveguide, the mechanical constraint on the antenna aperture and the optimization of the antenna directivity within the cryostat aperture window. The arrays are obtained by superimposing aluminum plates made with CNC milling, which is a relatively fast and low-cost manufacturing technique.

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