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QUBIC: Exploring the primordial Universe with the QU Bolometric Interferometer

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QUBIC (the Q and U Bolometric Interferometer for Cosmology) is a CMB polarimeter designed to search the B-mode polarization of the CMB, the signature expected from primordial gravitational waves generated during the inflation phase of the early Universe.

QUBIC, a collaboration between French, Italian, Argentinean, Irish and British laboratories, is an innovative instrument based on the novel technology of bolometric interferometry that combined the high sensitivity of bolometric detectors (2048 Transition Edge Sensors) along with the observation of interference fringes (400 channels) allowing for an unprecedented control of systematic effects. Furthermore, our synthesized beam being significantly frequency-dependent, QUBIC has spectro-imaging capabilities allowing us to reconstruct multiple sub-frequency CMB polarizations maps within our two wide-band filters (150 and 220 GHz). This opens promising perspectives for the control of foreground B-modes contamination, especially in the likely presence of complex dust emission.

End-To-End simulations have shown that QUBIC will reach a sensitivity of $\sigma(r)=0.01$ after two years of integration.

After integration in 2018 in Paris, QUBIC is now being calibrated and tested showing behavior and performances in excellent agreement with our expectations and simulations. The instrument will be installed in late 2019 in its observation site near San Antonio de los Cobres on the Puna plateau in Salta, Argentina at 5000m a.s.l. offering dry atmosphere and clear sky.

Collaboration name

QUBIC

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