

# THE COLLABORATION



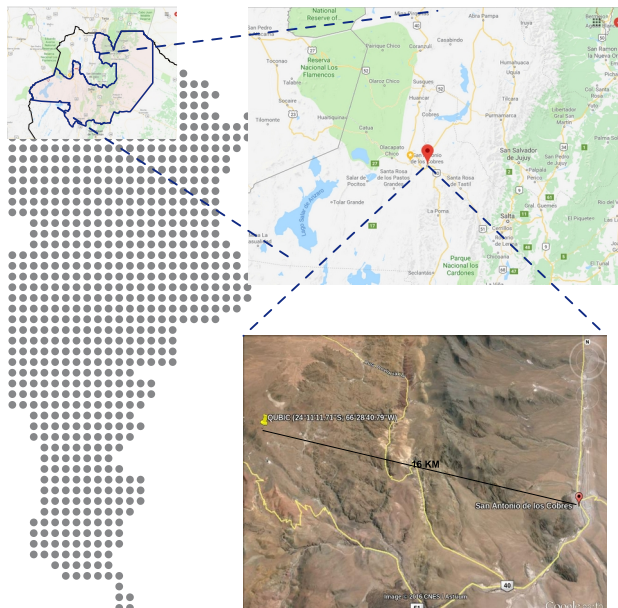
QUBIC is an international collaboration that involves several universities and laboratories in France, Italy, Argentina, the United Kingdom, Ireland and the United States.

A prototype that includes the cryostat of the first module was integrated in 2018, in France.

# THE SITE

The first module of QUBIC is placed in Alto Chorillo (Salta, Argentina), 16 km from San Antonio de los Cobres, at ~5000 m.a.s.l.

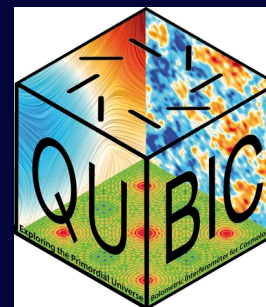
QUBIC, in its final version, will include 6 telescopes installed on an area of approximately 10,000 m<sup>2</sup>. This region is destined to become an "Astronomical Pole" and it is part of the "Salta Ventana al Universo" program.



Credits: Google Maps/Google Earth

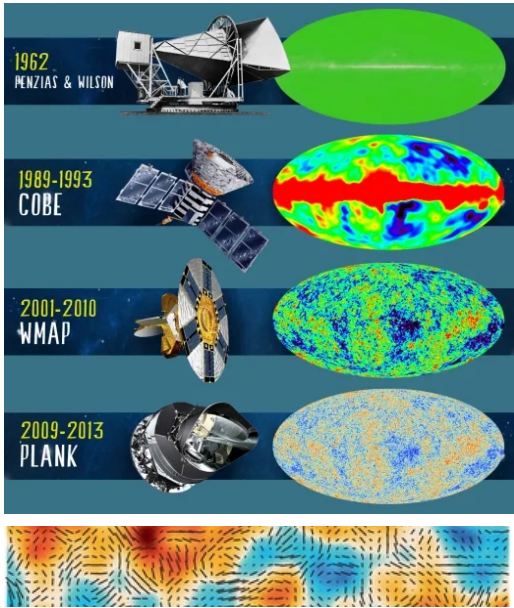


<https://www.qubic.org.ar>



**Q&U Bolometric Interferometer for Cosmology**

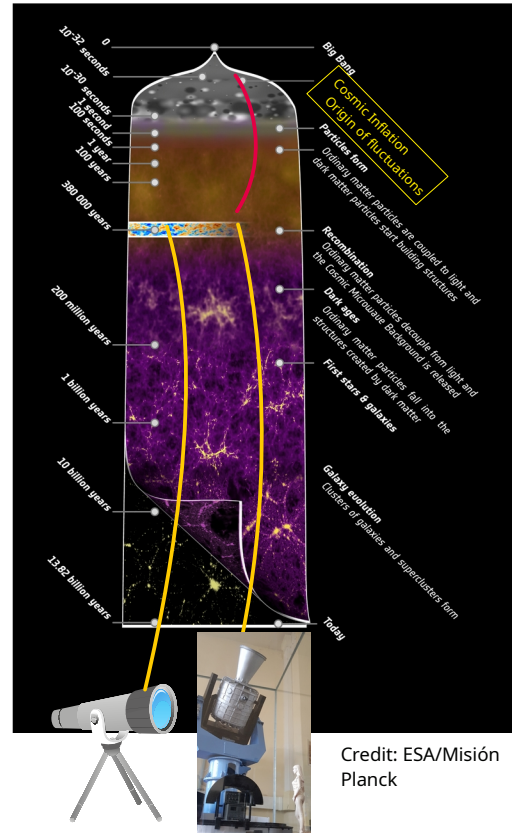
# CMB



Temperature fluctuations (color) and polarization (lines) of the CMB on a small patch of sky Credit: ESA/ Planck Mission

The cosmic microwave background (CMB) is the remaining radiation, relic of the origin of the Universe, which was left from the decoupling between the photons and the matter, an event that took place during the early Universe, 380,000 years after the Big Bang. Its detection in 1964 and its very small temperature fluctuations observed in 1992 thanks to the satellites COBE, both discoveries celebrated by Nobel prizes, are among the main scientific advances of the 20th century. The deepened studies in the 21st century by WMAP and Planck space telescopes, have led us to a deeper understanding of the history of our Universe.

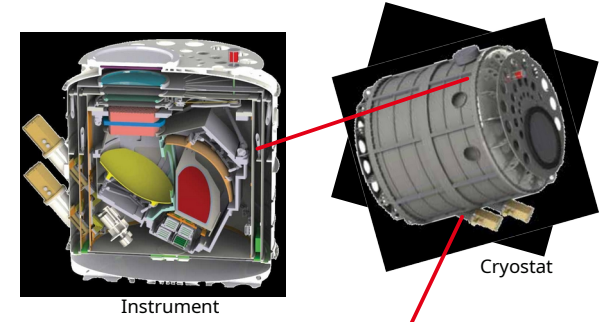
# POLARIZATION



Credit: ESA/Misión Planck

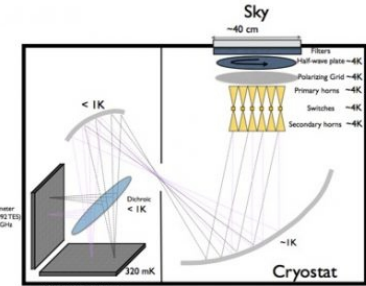
QUBIC is a cosmology experiment that aims to measure the polarization of cosmic microwave background radiation with great precision. This study would offer us an invaluable insight into what happened immediately after the Big Bang; for example, it would allow us to test inflation theories that claim that there was an extremely rapid exponential expansion during the first  $10^{-38}$  seconds of the Universe, an extremely small fraction of time.

# THE INSTRUMENT



Instrument

Cryostat



Instrument schematic view

The very weak polarized signal of the CMB requires even more complex and sensitive experiments than those developed so far, in order to detect it. To face this challenge, the Collaboration in the QUBIC Project has developed a completely new instrument based on the ground-breaking concept of bolometric interferometry, which combines the high sensitivity of bolometric detectors with the purity of interferometry.