



Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

Séminaire

QUBIC: the QU Bolometric Interferometer for Cosmology

QUBIC is a millimeter-wave Polarizer dedicated to the quest of the primordial B-modes of the CMB. Their discovery would be a major breakthrough in cosmology as they are considered as the smoking gun for inflation. Their level is directly related to the energy scale of inflation. The expected signal is however extremely weak (few tens of nK on a background of 3K) which makes their detection a huge experimental challenge: need for highly sensitive detectors, a very tight control of instrumental systematics and the problem of the contamination by galactic foregrounds. The quest for B-modes has been undertaken by many teams in the world with various instrumental choices, most of them based on the design of a direct imager.

QUBIC is a novel instrumental concept, Bolometric Interferometry, bringing together the high sensitivity of bolometers (Transition-Edge-Sensors fabricated in France) and the control of instrumental systematics offered by interferometry. Furthermore, due to its synthesized beam's interferometric nature, QUBIC is also a spectro-imager offering frequency sensitivity within the physical band of the instrument. This is a unique feature in the CMB instrumental landscape, expected to be very useful to control foreground contamination.

QUBIC is currently being integrated at APC, Paris and will be tested in-lab for a few months with a reduced number of detectors. It will then be shipped in late 2018 to its observation site in the north of Argentina, 5000m a.s.l. near the city of San Antonio de los Cobres in the Salta Province. After a few months of operations and demonstrations of its sensitivity, QUBIC will be upgraded with the nominal 2048 TES bolometers to start scientific observations in the course of 2019.

In this seminar, I will describe the scientific case for B-modes, the QUBIC instrumental concept as well as the status of the integration.

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**Lundi 26 Février
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Responsables séminaires

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