



## *Séminaire du Laboratoire de l'Accélérateur Linéaire*

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APC Paris

**Mardi 30 Octobre 2012 à 11 :00**

## **QUBIC : The QU Bolometric Interferometer for Cosmology**

One of the major challenges of modern cosmology is the detection of B-mode polarization anisotropies in the CMB. These originate from tensor fluctuations of the metric produced during the inflationary phase. Their detection would therefore constitute a major step towards understanding the primordial Universe. The expected level of these anisotropies is however so small that it requires a new generation of instruments with high sensitivity and extremely good control of systematic effects. We propose the QUBIC instrument based on the novel concept of bolometric interferometry, bringing together the sensitivity advantages of bolometric detectors with the systematics effects advantages of interferometry. The instrument will directly observe the sky through an array of entry horns whose signals will be combined together using an optical combiner. The whole set-up is located inside a cryostat. Polarization modulation will be achieved using a rotating half-wave plate and interference fringes will be imaged on two focal planes (separated by a polarizing grid) tiled with bolometers. We show that QUBIC can be considered as a synthetic imager, exactly similar to a usual imager but with a synthesized beam formed by the array of entry horns. Scanning the sky provides an additional modulation of the signal and improve the sky coverage shape. The usual techniques of map-making and power spectrum estimation can then be applied. We show that the sensitivity of such an instrument is comparable with that of an imager with the same number of horns. We anticipate a low level of beam- related systematics thanks to the fact that the synthesized beam is determined by the location of the primary horns. Other systematics should be under good control thanks to an autocalibration technique, specific to our concept, that will permit the accurate determination of most of the systematics parameters.

**Salle 101 du LAL - Bât. 200, Orsay**

Thé et café seront servis 1/4 h avant le séminaire



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