

## The frequency domain multiplexing layout for the LiteBIRD experiment cold readout

LiteBIRD (Lite (Light) satellite for the studies of B-mode polarization and inflation from cosmic background radiation detection) is a future three-year space mission whose primary objective will be to observe and measure the B-modes of polarization of the Cosmic Microwave Background (CMB). The LiteBIRD satellite will be equipped with three telescopes observing the sky at different frequencies in order to separate the CMB signal from the polarized foreground. The focal planes will be populated with around 5 thousands superconducting TES (Transistor Edge Sensor) bolometers, which will be read out through a Frequency Division Multiplexing Electronics (FDM). The FDM is composed of a warm ( $\sim 300$  K) and a cold (1.6 K and 0.1 K) section. The cold FDM section consists of lithographed LC filters. The detectors with relative multiplexing resonators, are connected to the SQUIDs (Superconductive QUantum Interference Devices) which work as trans-amplifiers. A systematic effect called crosstalk associated with the TESs and the LC filters that can sabotage the detection of sky signals can be defined. It can lead to a leakage of current from one leg of the circuit to the other, resulting in incorrect processing of the signal.

In this work, the operation of the multiplexed cold readout is presented, together with an example of the design of the lithographed LC chip. Preliminary studies to define the main contributors to the crosstalk affecting the LC filters are reported, with particular emphasis on the relationship between crosstalk and the layout of the LC filter chip.

**Primary author:** DI GIORGI, Eugenia (Università di Trento/INFN Sezione of Pisa)