Poster

A mm-wave Polarization Analyser Using LEKIDs: Strategy and Preliminary Numerical Results

Andrea Tartari (PCCP Université Paris Diderot - Laboratoire APC)

Co-Authors: B.Belier, M.Calvo, D.Cammilleri, A.Monfardini, M.Piat, D.Prele, G.F.Smoot

The context of this study is the development of detectors in view of future CMB experiments. Our goal is to demonstrate the possibility to make a mm-wave polarisation analyser at 150 GHz using Lumped Element Kinetic Inductance Detectors. LEKIDs have an intrinsic optical response that is weakly polarization-senstive, i.e. orthogonal linear polarizations are absorbed with comparable efficiencies (with a separation typically not exceeding few dB). To overcome this difficulty, we achieve a polarized response by means of small ($\sim \lambda \times \lambda$) superconducting Nb wire-grids. Each grid is deposited on the rear side of the 300 micron Si substrate, on which 20 nm Al resonators are patterned, so that each pixel may in principle respond as an independent polarization analyzer. Simulations show encouraging results, with a deep (-20 dB) rejection of the unwanted polarization. This pilot study allows us to address some relevant questions that may be crucial in view of a full polarimetric architecture development. In particular, our first prototypes will allow us to assess the behavior of small grids and the interaction between adjacent polarized pixels. What we present here are preliminary design results about devices that are currently being realized, and soon ready for optical response characterization.