Poster

Calibration System with Modulated Polarization Source for Superconducting Detectors at 0.1 Kelvin

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We developed a calibration system with modulated polarization source for superconducting detectors at 0.1∼K stage of a dilution cooler. Our target application is the detector calibration for observation of the cosmic microwave background (CMB) polarization. Therefore, the calibration system is required to generate a well-characterized polarization signal in a wide frequency range ≤ ∼300 GHz). The calibration system is attached at the bottom of the 0.1∼K stage. Radio absorbers, which attached on an inner wall of a cylindrical metal shield, emit an unpolarized black body radiation (5∼K). It reflects off an aluminum mirror at 120∼K, which induces a linearly polarized component because of the finite emissivity of the mirror; magnitude of the polarization is 60∼mK in this configuration. An axis of the polarization can be varied with the rotation of the mirror. Therefore, the detectors measure the modulated polarization, however unpolarized radiation into the detector is maintained to be constant. _We succeed to cool the system properly. We also demonstrated the system by using micro kinetic inductance detectors (MKIDs); detection of the modulated polarization signal with antenna coupled MKIDs which are sensitive for millimeter wave at 95∼GHz band.