Development of Octave-band Planar Ortho-Mode Transducer with MKID for CMB B-mode Observations

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For cosmic microwave background B-mode observation, we describe a design of broadband horn coupled planar orthomode transducer (OMT) with Microwave Kinetic Inductance Detector (MKID). In our design, 90 and 150 GHz frequency bands are covered in single pixel. Silicon-on-insulator (SOI) wafer has been selected for planar OMT and a broadband coplanar waveguide 180-degree hybrid is used to cancel higher mode signals of circular waveguide. After microstrip bandpass diplexer, a microstrip line to coplanar waveguide transition structure is used for coupling signal to MKID. A 4-pixel module is under test and we plan to deploy these multi-chroic polarimeters on Nobeyama 45-m telescope.