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Resonance Spectra of MKIDs Obtained with Frequency Sweeping Scheme

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We are developing a detector array for astronomical observation in 100-GHz band using Microwave Kinetic Inductance Detector (MKID) and a readout system for the array with frequency sweeping scheme, which uses a frequency sweeping probe signal instead of a fixed-frequency probe signal. This scheme enables us to obtain resonance spectra of MKIDs in an array simultaneously and to derive the resonance frequencies related to the power of incoming radiation. It has the advantage that the derived resonance frequencies are not affected by changes of gain and delay in the transmission line. The resonance profile measured, however, can be distorted by frequency sweeping, and it is necessary to evaluate the effect of frequency sweeping on resonance spectrum. We made measurements using the scheme with several frequency-sweep velocities and checked dependence of the resonance frequency and the Q-factor on it. A slow frequency sweep causes only small difference of resonance spectrum from an ideal profile, and is suitable for astronomical application.

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Less than 5 years of experience since completion of Ph.D

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