Poster

Fast and High-dynamic Range Imaging with Superconducting Tunnel Junction Detectors

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I focus on our recent developments and future prospect of superconducting tunnel junction imaging arrays in terahertz frequency region. We have demonstrated combination test of the submillimeter-wave SIS photon detectors and GaAs-JFET cryogenic integrated circuits. In submillimeter-wave, relatively large background photo-current can be readout by fast-reset integrating amplifiers. Integration time of 1 msec enables fast frame rate readout as well as large dynamic range imaging, resulting in the dynamic range of more than 10000 in one second of integration. Ultimate fast and high dynamic range performance of STJ detectors will be obtained when photon counting capabilities are employed in terahertz frequencies. When input photon rate of 100 MHz is to be measured, their photon statistics will tell us not only their intensity, but also their phase and emission mechanism. Application of photon statistics will be a new tool for future astronomical observations. The design parameters of STJ terahertz photon counting detectors will be discussed into detail.