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Title:Development of superconducting mixers for THz astronomy
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Abstract:The terahertz (THz) regime, loosely defined as 0.1-10 THz, is the last frequency window to be fully explored in astronomy. In particular, it is a regime in which there are rich molecular rotation lines and atomic fine structure lines. They are very important tracers for studying the dynamics of astronomical objects such as stars and planetary systems. Observing those spectral lines usually makes use of coherent detectors (i.e., heterodyne mixers). With sensitivity approaching the quantum limit, superconducting mixers have become the coherent detector of choice in THz astronomy. In this paper we mainly introduce the superconducting mixers developed at Purple Mountain Observatory and those for international collaborative projects.
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Inspec controlled terms:astrochemistry - interstellar molecules - superconducting mixers
Uncontrolled terms:superconducting mixers - terahertz astronomy - frequency window - molecular rotation lines - and atomic fine structure lines - astronomical objects - planetary systems - spectral lines - heterodyne mixers - quantum limit - coherent detector - international collaborative projects - frequency 0.1 THz to 10 THz
Inspec classification codes:A9840C Interstellar molecules and masers - A9530E Astrophysical atomic, molecular, and solid state processes and interactions - B1250 Modulators, demodulators, discriminators and mixers - B3240 Superconducting devices
Numerical data indexing:frequency 1.0E+11 1.0E+13 Hz
Treatment:Practical (PRA); Theoretical or Mathematical (THR)
Discipline:Physics (A); Electrical/Electronic engineering (B)
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