

## A 1.4-THz Superconducting HEB Mixer for DATE5

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**Abstract**—Purple Mountain Observatory as well as its collaborators is proposing to build a 5-m THz telescope (DATE5) at Dome A, Antarctic. Two THz heterodyne receivers, with one at 1.4 THz, are being considered as its first generation instrument. Here we report on the development of a 1.4-THz superconducting hot-electron bolometer (HEB) mixer for DATE5, which adopts a twin-slot antenna design. The direct-detection spectral (FTS) response of the 1.4-THz superconducting HEB mixer, with the HEB device fabricated at MSPU, has been measured, giving a frequency coverage of 0.8~1.5THz. And the measured FTS response appears in good agreement with the simulated one. Preliminary noise-temperature measurement at a lower frequency of 0.85 THz shows a receiver noise temperature of 1500 K. The estimated performance at 1.4 THz should be less than 1000 K in terms of the measured FTS response. Detailed simulation and experimental results will be presented.