MONOLITHIC Si BOLOMETER ARRAYS: DETECTORS FOR FAR INFRARED AND SUBMILLIMETER DETECTION

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ABSTRACT: The improvement of photoconductors and photovoltaic detectors for $\lambda < 200$ μm has displaced bolometers as detectors of choice for many applications requiring high sensitivity. Continued development of bolometers for operation at low temperatures ($T < 0.1$ K) has resulted in significant improvements in their sensitivity, making them excellent choices for many broad band applications at $\lambda > 200$ μm, cryogenic spectrometer applications in the submillimeter, and applications requiring extreme stability and ease of calibration.

I will describe the development of bolometers over the past decade, with particular emphasis on the detectors we have developed at GSFC. Detectors have been constructed in 36 element arrays with NEP $\sim 5 \times 10^{-18}$ W/$\sqrt{}$Hz and a response time of ten ms. Such detectors are very useful for many current problems in Cosmic Microwave Background studies and submillimeter spectroscopy. We will describe the current state of development of the detectors and the improvements we are pursuing.

There has been significant progress in the development of superconducting tunnel junction detectors for operation in the far infrared and submillimeter spectral range. Though at an early stage, these detectors have great promise of excellent sensitivity and ease of array fabrication. I will discuss the current developments in this area.

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DISCUSSION

WAMPLER: Can you compare hetrodyne interferometry with imaging interferometry using bolometer arrays?

MOSELEY: Bolometer arrays probably have a sensitivity advantage for interferometry over current hetrodyne systems for continuum sources, but the hetrodyne systems may be technically easier to implement.

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