

DETECTION OF MILLIMETER-TO-INFRARED RADIATION

by

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ABSTRACT

The various mechanisms for the detection of millimeter-to-infrared radiation will be surveyed. Techniques to be covered include intrinsic photoconductors (such as HgCdTe), extrinsic photoconductors (mainly germanium doped with various impurities), free-carrier absorbers (such as InSb), superconducting Josephson-effect point contacts, carbon and Ge cryogenic bolometers, and room-temperature bolometers (such as the thermistor, thermoelectric and pyroelectric detectors).

The fundamental sensitivity limitations of envelope detectors, coherent amplifiers and heterodyne receivers will be discussed and compared. The contributions due to Johnson, shot, phonon, background and quantum noise will be pointed out.

Several recent developments in millimeter-to-infrared detector technology will be described and data presented. These include a broadband thermistor bolometer, the superconducting Josephson detector and 10.6 micron 1-GHz bandwidth heterodyne receiver.

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