

Active Millimeter-wave and THz Imaging with Antenna-coupled Microbolometers for Concealed Weapons Detection

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One possible solution to the shortcomings of existing security technologies is the imaging of concealed weapons and contraband at millimeter wavelengths. At NIST, we have successfully demonstrated an active, video-rate imaging system based on antenna-coupled microbolometers. The initial demonstration was performed with a 2D staring array, consisting of 120 microbolometers coupled to lithographic ring slot antennas. Illumination of the scene was carried out using a high-power pulsed IMPATT oscillator. The voltage signal from the bolometers resulting from the detected radiation reflected by the target was subsequently amplified by an integrating sample-and-hold preamplifier multiplexer, and displayed in real time on a PC. In this talk we will summarize these initial results with our imaging system, as well as present the current status of our second generation imager that in the near future will provide some 40 000 pixels at 30 Hz by utilizing conical scanning optics.