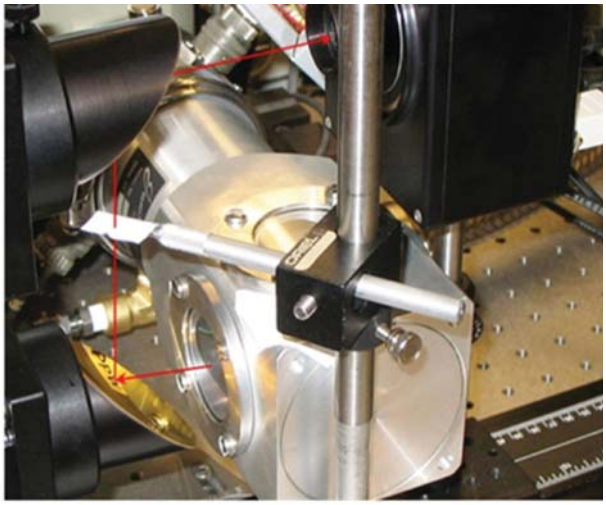
RSC
REMOTE SENSING CENTER
at the Naval Postgraduate School

TERAHERTZ

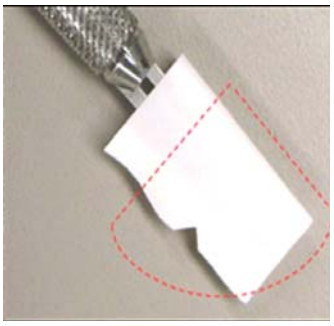
Microbolometer Infrared Technology

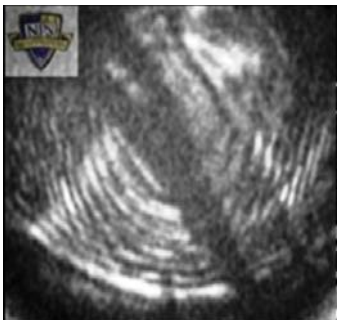
OBJECTIVE: Investigate the use of microbolometer infrared technology for real time imaging at THz frequencies.

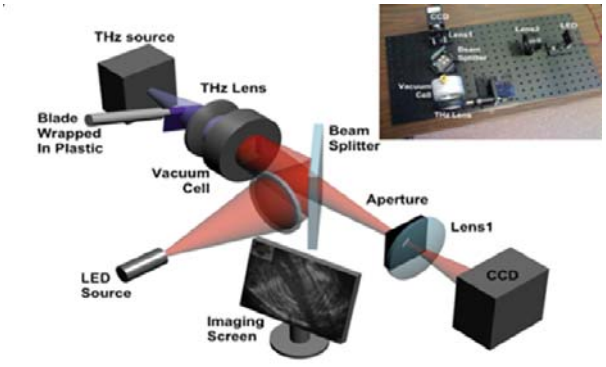


PHASE 1: During the initial phase of research, a detailed study of real-time THz imaging characteristics of a microbolometer infrared camera will be carried out using a quantum cascade laser (QCL) source. The camera will be fitted with THz comparable optics to improve the transmission of THz energy through the optics since it was found during the initial experiments that the infrared optics strongly absorb 3.6 THz radiation.

PHASE 2: The findings in the initial phase will be incorporated into the design of optimized microbolometer pixels for THz sensing. The longer wavelengths at THz frequencies allow us to increase the pixel dimensions from their infrared counterparts. This will improve both spatial resolution as well as noise-equivalent-temperature difference (NEDT) due to larger pixel area. In addition to pixel geometry, we will investigate THz absorption characteristics of potential new membrane materials using Fourier transform THz spectroscopy. The optimized pixels will be fabricated using a commercial MEMS foundry and tested using the available THz sources.







The figures-of-merit of the sensors, which will be determined, include responsivity, detectivity and NEDT. The incorporation of new materials and optimized structural parameters will result in highly sensitive microbolometer pixels for sensing at THz frequencies.

For Further Information Contact:
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