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Fabrication of MEMS Bimaterial Sensors for Uncooled THz Imaging.[1] DRAGOSLAV GRBOVIC, GAMANI KARUNASIRI, Naval Postgraduate School — Recently, there has been a significant interest in Terahertz (THz) technology, primarily its applications in concealed object detection and medical imaging. THz region of the spectrum has been underutilized due to lack of compact and efficient sources and detectors. THz imaging has recently been achieved using uncooled, microbolometer infrared (IR) camera and quantum cascade laser (QCL) operating as a THz illuminator. However, bolometer IR cameras are not optimized for the THz band and fabrication of their focal plane arrays (FPAs) is complex due to requred monolithic integration of detectors and readout electronics. Recent developments in bi-material based IR FPAs with optical readout, substantially simplify the fabrication process by decoupling readout from sensing. This presentation describes the design and fabrication of THz-optimized bi-material FPAs, as well as integration of the real-time imaging system. The detection scheme involves detector deformation to minute temperature changes due to absorption of THz radiation. Individual detector deformations are simultaneously probed by shining visible light on entire FPA and reflecting it into a CCD camera. Optical readout eliminates the self-heating effects, enabling longer integration times and, better signal-to-noise ratio.

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