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Detection of 3.4 THz Radiation from a Quantum Cascade Laser using Microbolometer Infrared Camera BARRY BEHNKEN, GAMANI KARUNASIRI, MICHELE LOWE, Naval Postgraduate School, DANIELLE CHAMBERLIN, PETER ROBRISH, Agilent Laboratories, J. FAIST, University of Neuchatel — Microbolometer infrared cameras are traditionally used for imaging objects in the 8-12 μm atmospheric window. Their use for imaging in the terahertz frequencies (0.1 – 10 THz) is relatively unknown. In a recent experiment, a microbolometer camera with 160x120 pixels was used for real time detection of 3.4 THz radiation from a quantum cascade laser. The focal plane array of the camera consists of 50x50 μm^2 pixels made of a composite film of Si_3N_4 membrane and VO_x thin resistive layer for sensing the temperature change. The laser was operated at 20 K with a peak power of 10 mW and duty cycle of 7%, providing an average power of roughly 700 μW. Initial experiments were carried out without the focusing Ge lens of the camera, since the antireflection coating on it was found to absorb most of the THz laser power. Recently we have incorporated a picarin lens, capable of 80% transmittance at THz frequencies, to enhance the light collection and improve detection capability. Video recordings of the laser beam interacting with various objects, with and without the use of focusing optics, will be presented.

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