Novel mid-infrared imaging system based on single-mode quantum cascade laser illumination and upconversion

Compared to the visible or near-infrared (NIR) spectral regions, there is a lack of very high sensitivity detectors in the mid-infrared (MIR) that operate near room temperature. Upconversion of the MIR light to NIR light that is imaged using affordable, fast, and sensitive NIR detectors or cameras represents an attractive possibility and the technique has been successfully demonstrated using a broad-spectrum light source [1]. If, however, high brightness is advantageous, especially using a narrow wavelength band, a laser is a more useful light source. In this paper we present the first MIR imaging system based on upconversion technology with an external cavity quantum cascade laser (ECQCL) used as the illumination source.

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