Upconversion detection of long-wave infrared radiation from a quantum cascade laser - DTU Orbit (28/07/2019)

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Broadly tunable upconversion is demonstrated for long-wave infrared (LWIR) detection. The upconversion system is evaluated by the detection of 50 ns pulses from a narrow linewidth tunable quantum cascade laser (QCL) in the 9.4 to 12 μm range. The LWIR signal is mixed with a 1064 nm laser beam in a silver gallium sulfide (AgGaS2) crystal, resulting in an upconverted signal in the 956 to 977 nm range, using angle tuning for optimal phase-matching. This allows for efficient, high speed detection using a standard silicon detector. A theoretical model including absorption and diffraction shows qualitative agreement with experimental data. (C) 2018 Optical Society of America under the terms of the OSA Open Access Publishing Agreement

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