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Double Application Terahertz Source with Nano-disk Sensors based on Differential Quantum Cascade Laser

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Abstract

In the last decade quantum cascade lasers (QCLs) have become the most widely used source of mid-infrared radiation, finding large scale applications because of their wide tunability and overall high performance. However far-infrared (terahertz) QCLs have lagged behind in terms of performance and impact due to the inability so far of achieving room temperature operation. Here we review research that has led to a new class of QCL light sources that has overcome these limitations leading to room temperature operation in the terahertz spectral range, with nearly 2 mW of optical power and significant tunability, opening up also this region of the spectrum to a wide range of applications. At the end we used terahertz sensors to capture power in two directions for using to detect and mix frequencies at GHz prossesors.

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Keywords: “QCL”, “Nano-disk Sensors”, “difference-frequency generation (DFG)”

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