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## **Quantum cascade laser frequency combs and applications in near field THz nanoscopy**

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**Abstract:** Optical frequency combs (FCs), that establish a rigid phase-coherent link between the microwave and optical domains of the electromagnetic spectrum, are emerging as a key high-precision tools for the development of quantum technology platforms. These include potential applications for communication, computation, information, sensing and metrology, and can extend from the near-infrared with micro-resonator combs, up to the technologically attractive terahertz (THz) frequency range, where powerful and miniaturized quantum cascade laser (QCL) can spontaneously generate stable FCs. In this talk I'll review our recent advances in the development of stable THz QCL FCs and harmonic frequency combs with record optical power/mode and record dynamic range and I'll discuss their application potential in the fascinating area of near-field nanoscopy.