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Title:Terahertz plasmonics

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Abstract:Semiconductor microstructures can be used to tailor the dispersion properties of surface plasmon polaritons in the terahertz (THz) frequency range, and therefore can be used as important building blocks for terahertz optical devices. The physical principles of three structures are discussed: plasmonic second-order gratings, designer (spoof) surface plasmon polariton structures, and channel polariton structures. The effectiveness of these structures is demonstrated by utilising them to improve power throughput and to reduce the beam divergence of edge-emitting THz quantum cascade lasers. Plasmonics promises compact and low-loss solutions for manipulating light at THz wavelengths, and will have a large impact on applications such as imaging, light detection and ranging (LIDAR), and the heterodyne detection of chemicals.

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