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Title:Evolution of highly confined surface plasmon modes in terahertz quantum cascade laser waveguides

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Abstract:The evolution of surface plasmon (SP) supermodes through the effective coupling of isolated SP modes in a semiinsulating quantum cascade laser (QCL) waveguide is thoroughly discussed here. The effect of varying the material and geometric parameters of GaSb/AlGaSb QCL operating at 3.0 THz are thoroughly studied using a full-vectorial finite-element method. It was observed that this structure is prone to mode degeneration caused by resonant interaction of the lasing mode with a higher order plasmon mode. An optimized design is also proposed to suppress such adverse affects and highly divergent field profiles arising from the generation of higher order lateral modes.

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