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Title:Flexible, low-loss waveguide designs for efficient coupling to quantum cascade lasers in the far-infrared

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Abstract:We coupled linearly polarized and azimuthally polarized Terahertz quantum cascade lasers (QCLs) to the low-loss optical modes of hollow core waveguides having a sequence of different metallic or dielectric inner coatings. The latter waveguides have been specifically designed to force the propagation of a dominant optical mode once the thickness ( $d$ ) of the inner dielectric coating is properly chosen. Our results demonstrate that both the TE<sub>01</sub> and the TE<sub>11</sub> modes can be easily converted to a hybrid one when  $d > 6 \mu\text{m}$  allowing the propagation of THz QCL beams with transmission losses as low as 1.5 dB/m, bending losses  $< 1.1$  dB and reasonably high coupling efficiencies (87%). © Springer Science+Business Media, LLC 2012.

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