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Title

Guiding a terahertz quantum cascade laser into a flexible silver-coated waveguide

Source

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Abstract

We report on a promising experimental approach to efficiently couple quantum cascade laser (QCL) sources fabricated in either surface emitting micro-ring resonator or standard edge emitting geometry with terahertz (THz) hollow waveguides. We show that the THz beam of a QCL can be guided into flexible silver-coated polycarbonate waveguides having length in the range 4-12 cm with coupling efficiencies  $> 80\%$ . The dominant optical modes propagating through the waveguides can be selected by varying the polarization of the incoming QCL beam, the coupling geometries, and/or bending the hollow waveguide. Either the lowest loss TE(11) or the TE(01) mode can be selected and guided through the waveguide with propagation losses in the range 2.1-4.4 dB/m and bending losses lower than 1.2 dB. (C) 2011 American Institute of Physics.