

Waveguide integration of a >4.7 -THz quantum-cascade laser

Eleanor Nuttall¹, Yingjun Han¹, Diego Pardo², Sanchit Kondawar¹, Nick Brewster², Mohammed Salih¹, Lianhe Li¹, Michael Horbury¹, Giles Davies¹, Edmund Linfield¹, Hui Wang², Paul Dean¹, Brian Ellison², and Alexander Valavanis¹

¹University of Leeds

²Rutherford Appleton Laboratory

May 12, 2022

Abstract

We have demonstrated waveguide integration of terahertz quantum cascade lasers (THz QCLs) at frequencies above 4.7 THz. A precision micromachining technique, followed by diamond-turning and electroless-plating has been used to manufacture hollow rectangular waveguides with integrated diagonal feedhorns. We show that surface roughness at the $1\mu\text{m}$ level is achieved, enabling outcoupling of radiation in the 4.75–5.05 THz band, with a divergence angle of 5° along the plane of the QCL substrate.

Hosted file

4.7THz_Electronics_Letters.pdf available at <https://authorea.com/users/481699/articles/568595-waveguide-integration-of-a-4-7-thz-quantum-cascade-laser>







