

Research Highlight | Published: 21 June 2019

TERAHERTZ OPTICS

Room-temperature comb

Oliver Graydon

Nature Photonics **13**, 438 (2019)

Nat. Commun. **10**, 2403 (2019)

A frequency comb in the terahertz region and that operates at room temperature could prove useful for applications in spectroscopy. The device, designed and built by scientists from Northwestern University in the US, relies on difference-frequency generation from a mid-infrared (mid-IR) quantum cascade laser (QCL). A distributed feedback grating is integrated into the QCL's cavity in order to simultaneously generate a single mode at one distinct wavelength in the mid-IR as well as a mid-IR comb. The two are then mixed together to perform down-conversion into the terahertz region. The approach is attractive as it offers a compact semiconductor chip-based approach to comb generation and operates at room temperature. When the laser was driven at a current of 1.55 A, a total of 5 comb lines with a spacing of 245 GHz were generated between 2.2 and 3.3 THz.

Author information

Affiliations

Nature Photonics

Oliver Graydon

Corresponding author

Correspondence to Oliver Graydon.

Rights and permissions

Reprints and Permissions

About this article

Published Issue DateDOI

21 June 2019 July 2019 <https://doi.org/10.1038/s41566-019-0484-5>

Share this article

Anyone you share the following link with will be able to read this content:

Subjects Frequency combs • Terahertz optics

Nature Photonics

ISSN 1749-4893 (online)

natureresearch

SPRINGER NATURE

© 2019 Springer Nature Publishing AG

 Get the most important science stories of the day, free in your inbox. Sign up for

Nature Briefing

 Close