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High Frequency Modulation of Transverse-Coupled-Cavity VCSELs for Radio Over Fiber Applications

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IEEE PHOTONICS TECHNOLOGY LETTERS

Volume: 26 Issue: 3 Pages: 281-284

DOI: 10.1109/LPT.2013.2292577

Published: FEB 1 2014

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Abstract

We demonstrate a high-speed and efficient direct modulation of a novel transverse-coupled-cavity vertical cavity surface emitting laser for radio over fiber applications. A bow-tie joint connection between two oxide apertures results in a leaky traveling wave in the lateral direction between the two cavities. The measured L/I characteristics and lasing spectra demonstrate coherent coupling of the two cavities. The small signal response of the fabricated device shows a large enhancement of over 30 dB in the modulation amplitude at frequencies > 25 GHz. The resonantly enhanced modulation response is suitable for efficient narrow-band modulation in the millimeter wave range over 25 GHz far beyond the intrinsic modulation bandwidth of the laser without optical feedback.

Keywords

Author Keywords: VCSEL; radio over fiber; slow light; photonics integration; direct modulation

KeyWords Plus: OPTICAL FEEDBACK; EXTERNAL-CAVITY; LASERS; BANDWIDTH; GHZ; RESONANCE; WIRELESS; NETWORKS; RANGE; LIGHT

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Funding

Funding Agency	Grant Number
JSPS KAKENHI	S22226008
Deanship of Scientific Research, King Abdulaziz University	8/130/1433/HiCi

[View funding text](#)

Publisher

IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC, 445 HOES LANE, PISCATAWAY, NJ 08855-4141 USA

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Research Areas: Engineering; Optics; Physics

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Document Information

Document Type: Article

Language: English

Accession Number: WOS:000329993500020

ISSN: 1041-1135

eISSN: 1941-0174

Other Information

IDS Number: 293SH

Cited References in Web of Science Core Collection: 33

Times Cited in Web of Science Core Collection: 7

