

Efficient frequency comb generation in AlGaAs-on-insulator - DTU Orbit (09/11/2017)

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The combination of nonlinear and integrated photonics enables Kerr frequency comb generation in stable chip-based microresonators. Such a comb system will revolutionize applications, including multi-wavelength lasers, metrology, and spectroscopy. Aluminum gallium arsenide (AlGaAs) exhibits very high material nonlinearity and low nonlinear loss. However, difficulties in device processing and low device effective nonlinearity made Kerr frequency comb generation elusive. Here, we demonstrate AlGaAs-on-insulator as a nonlinear platform at telecom wavelengths with an ultra-high device nonlinearity. We show high-quality-factor ($Q > 105$) micro-resonators where optical parametric oscillations are achieved with milliwatt-level pump threshold powers, which paves the way for on-chip pumped comb generation.

General information

State: Published

Organisations: Department of Photonics Engineering, Nanophotonic Devices, Centre of Excellence for Silicon Photonics for Optical Communications

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Pages: 823-826

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: Optica

Volume: 3

Issue number: 8

ISSN (Print): 2334-2536

Ratings:

Web of Science (2017): Indexed Yes

Scopus rating (2016): CiteScore 8.05

Web of Science (2016): Indexed yes

Scopus rating (2015): CiteScore 7

Web of Science (2015): Indexed yes

Web of Science (2014): Indexed yes

Original language: English

DOIs:

10.1364/OPTICA.3.000823

Source: PublicationPreSubmission

Source-ID: 125113767

Publication: Research - peer-review › Journal article – Annual report year: 2016