Room I (203)

Session Title 26I3 / [T10] Micro/Nano Lasers
Date & Time Wednesday, 26 August, 15:45 ~ 17:15
Session Chair Muhan Choi (Kyungpook National University, Korea)

[26I3-1] 15:45~16:00

Unidirectional Emission in Asymmetric Reuleaux Triangle 2-D Microcavity Laser

Chil-Min Kim[1], Jin-Hyeok Ryu[2], Ji-Won Lee[2], Changhwan Yi[1], Ji-Hwan Kim[1], Sung-Min Go[1], In-Goo Lee[3], Kwang Ryong Oh[3], and Sung-Bock Kim[2]

[1]Sogang University, Korea, [2]DGIST, Korea, [3]ETRI, Korea

In an asymmetric Reuleaux triangle microcavity laser, we experimentally confirm that the laser unidirectionally emits at a single window. In this shape, because the quality factor of the clockwise traveling wave is higher than that of the counter clockwise one, the clockwise traveling wave emits at a single window.

[26I3-2] 16:00~16:15

Dual-Mode Multi-Section Lasers with Nanoscale Surface Gratings

Mihail Dumitrescu, Topi Uusitalo, Heikki Virtanen, Jukka Viheriälä, Joel Salmi, and Antti Aho

Tampere University of Technology, Finland

Dual-mode multi-section distributed-feedback lasers with surface gratings have been fabricated using UV nanoimprint lithography. Frequency differences from 14GHz to 1.3THz for different longitudinal structures and frequency difference modulation speed up to 500MHz have been measured.

[26I3-3] 16:15~16:30

A Printed Nanobeam Laser on Silicon

Indra Karnadi[1], Jaehyeon Son[1], Ju-Young Kim[1], Hoon Jang[1], Putu Eka Pramudita[1], Seungwoo Lee[2], Bumki Min[1], and Yong Hee Lee[1]

[1]KAIST, Korea, [2]Sungkyunkwan University, Korea

A nanobeam laser made of InGaAsP material is printed on a SiO_2 /Si substrate via transfer-printing process. From this structure, single mode lasing near 1550 nm with continuous-wave (CW) operation at room-temperature is achieved.

[26I3-4] 16:30~16:45

Optimized Aperiodic Nanobeam Lasers

Suel-Ki Moon[1], Kwang-Yong Jeong[2], and Jin-Kyu Yang[1]

[1]Kongju National University, Korea, [2]KAIST, Korea

We demonstrated lasing action at aperiodic nanobeam cavities composed of two different air holes at room temperature. As the size ratio of two holes is changed, different type of optical modes is selected for lasing.

[26I3-5] 16:45~17:00

Room Temperature Continuous Operation of Sub-μW Threshold Nano-Island Lasers

Hoon Jang, Indra Karnadi, Putu Pramudita, and Yong Hee Lee

KAIST, Korea

Nanobeam laser with nano-island quantum well (QW) is demonstrated. Continuous operation with 210 nW threshold is achieved at room-temperature. We remove the absorptive QW surrounding the central cavity, leaving the gain only inside $0.7\times0.25\times0.02$ μm^3.

[26I3-6] 17:00~17:15

Self-Aligned InGaAsP Nano-Emitters Near Telecom-Wavelength

Putu Eka Pramudita, Hoon Jang, Chang-Min Lee, Indra Karnadi, Jungmin Lee, Myung-Ki Kim, and Yong Hee Lee

KAIST, Korea

We study selective wet-etching systems for realizing selfaligned nano-emitters. Controllability of the nano-emitters' shapes, sizes and positions are the major advantages of this method. Emission of nano-emitters at telecom-wavelength is characterized from the photoluminescence measurement.

Room J (204)

Session Title 26J3 / [T12] Nanophotonics Applications
Date & Time Wednesday, 26 August, 15:45 ~ 17:45
Session Chairs Francisco M. Soares (Fraunhofer HHI, Germany)
Kyoungsik Yu (KAIST, Korea)

[26J3-1] 15:45~16:15 Invited Talk

Nanophotonics for Future Data Communication and Ethernet Networks

Dieter Bimberg[1,2] and James A. Lott[1]

[1]Technische Universität Berlin, Germany, [2]King Abdulaziz University, Saudi Arabia

We present the design, physics, and performance of our novel nanophotonic lasers for present and visionary emerging applications in optical data communications and integrated photonic systems at on-chip through mega data center distances.

[26J3-2] 16:15~16:30

Design of a Current-Driven Optical Gate Switch Using a Si Waveguide and Phase-Change Material

Kentaro Kato and Hiroyuki Tsuda

Keio University, Japan

We have proposed and designed a current-driven optical gate switch using a Si waveguide and phase-change material. The ON-state loss and the power consumption of the optimized structure are 0.63 dB and 60 mW, respectively.

[26J3-3] 16:30~16:45

Near-infrared Silicon Sub-bandgap Photo-detectors for on-chip Integrated Optical Links

Jong-Bum You and Kyoungsik Yu

KAIST, Korea

We report near-infrared and high-speed silicon photodetectors capable of sub-bandgap light absorption based on the optically-assisted tunneling induced by a large electric field.

[26J3-4] 16:45~17:00

Si Photonic Crystal Compact Multilevel Modulators

Keiko Hojo, Yosuke Terada, Yosuke Hinakura, Naoya Yazawa, Tomohiko Watanabe, and Toshihiko Baba

Yokohama National University, Japan

We fabricated Si QPSK and PAM modulators with photonic crystal slow light waveguides and interleaved p/n junction, both of which have footprints less than 1 mm^2. 30-35 Gbps operation were observed in 300-450 μm devices.

[26J3-5] 17:00~17:15

Precise Wavelength Tuning of MEMS VCSELs Enabling 110-ch Operations

Masanori Nakahama, Takahiro Sakaguchi, Akihiro Matsutani, and Fumio Koyama

Tokyo Institute of Technology, Japan

We demonstrate the precise wavelength tuning of MEMS VCSELs with thermally-actuated cantilever for athermal operations. 110-channel operations with 100 GHz spacing were realized with SMSR of over 30 dB and output variation of below 2.5 dB.

[26J3-6] 17:15~17:30

Sub-wavelength Grating Assisted 3-dB Colorless Directional Coupler for TM Mode

Yaguang Qin, Yu Yu, Chaotan Sima, and Xinliang Zhang

Huazhong University of Science and Technology, China

We propose and theoretically demonstrate a colorless 3-dB directional coupler for TM mode. The fluctuation of insertion loss at the output port in the range of wavelength from 1.5 um to 1.6 um (100 nm bandwidth) is 3.1 dB.

[26J3-7] 17:30~17:45

Real-Time Spectrally-Resolved Imaging of the Transverse Modes in Broad Area Diode Lasers

Grant Brodnik[1], Stephen Misak[1], Daniel Dugmore[2], Evan Hale[3], Kirsten Middleton[4], and Paul Leisher[1]

[1]Rose-Hulman Institute of Technology, USA, [2]Teradiode Inc., USA, [3]University of Central Florida, USA, [4]L3 Communications SSG, USA

We demonstrate a simple system which is capable of resolving and imaging, in real time, the lateral modes of a multimode broad area diode laser. This technique enables direct characterization of the intensity distribution of each mode of the laser and differs from prior work in that it provides both high spectral resolution (< 3 pm) and real-time imaging. This will allow for the first time direct observation of the dynamics of closely spaced lateral modes of in high power broad area diode lasers.