

## Room I (203)

**Session Title** 26I1 / [T10] Waveguides  
**Date & Time** Wednesday, 26 August, 09:00 ~ 10:15  
**Session Chair** Seungwoo Lee (Sungkyunkwan University, Korea)

[26I1-1] 09:00~09:15

### Waveguide Side-wall Angle Dependant Resonance of a Si Micro Ring-resonator

Mohammad Rakib Uddin<sup>1</sup>, Nur'Azmina Lingas<sup>1</sup>, Bikash Nakarm<sup>2</sup>, and Yong Hyub Won<sup>2</sup>  
<sup>1</sup>Institut Teknologi Brunei, Brunei, <sup>2</sup>KAIST, Korea

Si waveguide side-wall angle dependant resonance characteristic of a micro ring-resonator is presented. The peak resonant wavelength and the modulation depth have changed significantly due to the changes of side-wall angle.

[26I1-2] 09:15~09:30

### Broadband Guidance and Control of Polarization Vector Beams in Small-core Ultrahigh-NA Optical Waveguides

Eunmi Kim, Ki Sang Lee, and Myeong Soo Kang  
KAIST, Korea

We demonstrate direct excitation and broadband guidance of polarization vector beams (PVBs) in commercially stock-available small-core ultrahigh-NA optical fibers. A simple numerical analysis supports the experimental results and provides criteria for stable guidance of PVBs.

[26I1-3] 09:30~09:45

### Grating Based MEMS Tunable Filter for WDM Optical Network

U. Poomalakshmi, Somya Agarwal, M. Balasubramanian and Prasant Kumar Pattnaik  
BITS-Pilani, India

A simulation model of in-plane MEMS tunable optical filter based on grating located on a silicon micro-machined cantilever beam is presented. Upon actuation a shift in filtered frequency varies linearly in C-band has been observed.

[26I1-4] 09:45~10:00

### Theoretical Investigation of Graphene-Based Inverted Rib-type Silicon Waveguides

Yonghan Kim and Min-Suk Kwon  
UNIST, Korea

We demonstrate that graphene-based inverted rib-type silicon waveguides can be used as absorption modulators. Simulation shows that the modulation depth of such a modulator is larger than those of previous graphene-based silicon waveguide modulators.

[26I1-5] 10:00~10:15

### Fabrication of 0.7 $\mu\text{m}^2$ Ridge Waveguide in Ion-Sliced LiNbO<sub>3</sub> by Proton-Exchange Accelerated Etching

Keisuke Tanaka and Toshiaki Suhara  
Osaka University, Japan

We fabricated ridge waveguides in ion-sliced LiNbO<sub>3</sub> by accelerated chemical etching in the proton-exchanged region. We obtained the low-loss waveguides of 0.7  $\mu\text{m}^2$  cross-sectional area. Strongly confined guided modes were obtained at 1.55  $\mu\text{m}$  wavelength.

## Room J (204)

**Session Title** 26J1 / [T12] Micro Cavity Devices  
**Date & Time** Wednesday, 26 August, 09:00 ~ 10:15  
**Session Chairs** Jifeng Liu (Dartmouth College, USA)  
Kyong Hon Kim (Inha University, Korea)

[26J1-1] 09:00~09:30 **Invited Talk**

### Ultrahigh-Q Asymmetric Microcavity Photonics on a Silicon Chip

Yun-Feng Xiao, Xue-Feng Jiang, Linbo Shao, Li Wang, and Qihuang Gong  
Peking University, China

We experimentally realized on-chip deformed microcavities supporting both highly unidirectional emission and ultrahigh Q factors exceeding 108. This type of microcavity holds potential in ultralow-threshold laser and sensitive nanoparticle detection.

[26J1-2] 09:30~09:45

### High-Frequency Self-Modulation in Short-External-Cavity VCSEL with Semi-Spherical Mirror

Tao Liu, Takeo Katayama, and Hitoshi Kawaguchi  
Nara Institute of Science and Technology, Japan

Optical output modulation of over 15 GHz frequency was achieved in a short-external-cavity VCSEL by using a semispherical mirror for the cavity. The modulation was caused by the beat note between two external cavity modes.

[26J1-3] 09:45~10:00

### Electro-Optic Polymer/TiO<sub>2</sub> Vertical Slot Waveguide Modulators

Yasufumi Enami<sup>1</sup>, Youssef Jouane<sup>1</sup>, Jingdong Luo<sup>2</sup>, and Alex Jeri<sup>2</sup>  
<sup>1</sup>Kochi University of Technology, Japan, <sup>2</sup>University of Washington, USA

We report the efficient poling of electro-optic (EO) polymer in a hybrid EO polymer/TiO<sub>2</sub> vertical slot waveguide modulators based on enhanced conductivity of sol-gel silica under-cladding. The electrical volume conductivity of sol-gel silica cladding increases approximately 30 times when the calcining time of the cladding layer is critically reduced to 45 minutes, which increases the in-device EO coefficient of the 600-nm-thick EO polymer film in modulators and reduces the lower halfwave voltage (V<sub>π</sub>) of the modulators. The lowest driving voltage (V<sub>π</sub>) of the TiO<sub>2</sub> slot waveguide modulator is 2.0 V for an electrode length (L<sub>e</sub>) of 10 mm and wavelength of 1550 nm (V<sub>π</sub>L<sub>e</sub> = 2.0 V-cm) for the low-index guest-host EO polymer SE0125. The optical propagation loss is reduced to 7 dB/cm.

[26J1-4] 10:00~10:15

### High Sensitivity, Ultra-Broadband SWNT-Graphene Hybrid Photodetector

Frank Wang<sup>1</sup>, Yuanda Liu<sup>1</sup>, Xiaomu Wang<sup>2</sup>, Yao Li<sup>1</sup>, Xizhang Wang<sup>1</sup>, Xinran Wang<sup>1</sup>, Yongbing Xu<sup>1</sup>, Yi Shi<sup>1</sup>, and Rong Zhang<sup>1</sup>

<sup>1</sup>Nanjing University, China, <sup>2</sup>Yale University, USA

A photodetector based on SWNT-graphene hybrid films and facile fabrication steps is demonstrated, which exhibits a remarkably high photoresponsivity of ~ 100 A/W, across visible (400 nm) to the telecommunication wavelengths (1550 nm).