

Room G (201)

Session Title 26G2 / [T08] Quantum Information II
Date & Time Wednesday, 26 August, 11:00 ~ 12:30
Session Chair Geoff Pryde (Griffith University, Australia)

[26G2-1] 11:00~11:30 Invited Talk

Round-robin Differential-phase-shift QKD Protocol

Masato Koashi

The University of Tokyo, Japan

Conventional quantum key distribution (QKD) schemes determine the amount of leaked information through estimation of signal disturbance. Here we present a QKD protocol based on an entirely different principle, which works without monitoring the disturbance.

[26G2-2] 11:30~11:45

Adaptive Polarization-State Monitoring and Stabilization Scheme for One-Way Polarization-Encoded Quantum Key Distribution Systems

Shengrong Timothy Yu¹, Jiun Yan Yap², Mao Tong Liu¹, Wenhan Wang², and Han Chuen Lim^{1,2}

¹Nanyang Technological University, Singapore, ²DSO National Laboratories, Singapore

We demonstrate an adaptive polarization-state monitoring and stabilization scheme for one-way polarization-encoded QKD. Polarization references are sent at a repetition rate that is adapted to the polarization drift condition to maintain a low QBER.

[26G2-3] 11:45~12:00

Measurement of Arbitrary Superpositions of Core Modes in a Multi-core Fiber

Hee Jung Lee^{1,2}, Han Seb Moon², Sang-Kyung Choi¹, and Hee Su Park¹

¹KIRSS, Korea, ²Pusan National University, Korea

We propose and demonstrate an experimental technique that generates and measures arbitrary superpositions of the core modes in a multi-core fiber. This technique is potentially useful for transmission of high-dimensional quantum states through optical fiber.

[26G2-4] 12:00~12:15

Demonstration of Quantum Permutation Algorithm with a Single Photon Ququart

Pei Zhang, Feiran Wang, Yunlong Wang, Ruifeng Liu, and Fulli Li

Xi'an Jiaotong University, China

We report an experiment to demonstrate a quantum permutation determining algorithm by employing photon polarization and spatial modes. This work displays the remarkable speedup of quantum algorithm and strong universality in quantum computation.

[26G2-5] 12:15~12:30

Experimental Observation of Decoherence-induced Symmetry Breaking in Entangled Photons

Hyang-Tag Lim, Jong-Chan Lee, Kang-Hee Hong, and Yoon-Ho Kim

POSTECH, Korea

Quantum states can exhibit exchange symmetry; local quantum operations on the subsystems are exchangeable without affecting the quantum state. Here, we report that the exchange symmetry is broken once decoherence is introduced, even though the photons still share non-zero entanglement.

Room H (202)

Session Title 26H2 / [T11] Optical Coherence Tomography
Date & Time Wednesday, 26 August, 11:00 ~ 12:30
Session Chair Donghyun Kim (Yonsei University, Korea)

[26H2-1] 11:00~11:30 Invited Talk

Expanding Imaging Ranges for Spectral Domain Optical Coherence Tomography

Hyung-Jin Kim¹, Pil Un Kim², Min Gyu Hyeon¹, Jee-Hyun Kim², and Beop-Min Kim¹

¹Korea University, Korea, ²Oz-tec Co., Korea, ³Kyungpook National University, Korea

Applicability of optical coherence tomography (OCT) has been expanding in various areas of medicine. Imaging larger areas using OCT while maintaining reasonable spatial resolution is one of the directions people pursue to enable new diagnosis. We have employed an ultrafast optical switch along with several new techniques to fully expand the spectral domain OCT imaging range in ophthalmology.

[26H2-2] 11:30~11:45

Deep-tissue Imaging with Collective Accumulation of Single Scattering Microscopy

Seungwon Jeong¹, Sungsam Kang¹, Wonjun Choi¹, Hakseok Ko¹, Taeseok D. Yang¹, Jungho Moon¹, Yonghyeon Jo¹, Jang Ho Joo¹, Jae-Seung Lee¹, Yong-Sik Lim², Q-Han Park¹, and Wonshik Choi¹

¹Korea University, Korea, ²Konkuk University, Korea

We present an approach that maintains full optical resolution in imaging deep within scattering media. Imaging depth of 11.5 times the scattering mean free path was achieved with near-diffraction-limit resolution of 1.5 μm .

[26H2-3] 11:45~12:00

Fiber-based Dual Modal System for Noncontact Photoacoustic and Optical Coherence Tomography

Jonghyun Eom¹, Seong Jun Park², Jae Hwi Lee¹, Soongho Park¹, and Byeong Ha Lee¹

¹GIST, Korea, ²UNIST, Korea

We present a dual modal system combining noncontact photoacoustic tomography and optical coherence tomography. The proposed system, composed of fiber-optic networks, uses one probing beam path, which provides the noncontact measurements. Multimodal images of phantoms were acquired to demonstrate the capability of the proposed system.

[26H2-4] 12:00~12:15

Visualization of Prostatic Nerves Using Polarization-sensitive Optical Coherence Tomography

Yeoreum Yoon¹, Yong Hyun Park², Seung Hwan Jeon², Won Hyuk Jang¹, Ji Youl Lee², and Ki Hean Kim¹

¹POSTECH, Korea, ²Catholic University of Korea, Korea

We demonstrate that polarization-sensitive optical coherence tomography (PS-OCT) can identify the cavernous nerve in the human and rat prostate ex vivo based on its birefringence. PS-OCT may be useful for nerve preservation during radical prostatectomy.

[26H2-5] 12:15~12:30

All-Fiber Burst Mode Laser System Integrated with OCT for Cataract Surgery

Denizhan Koray Kesim, Hamit Kalaycioglu, Can Kerse, and F. Ömer İlday

Bilkent University, Turkey

We demonstrate a burst-mode Yb all-fiber femtosecond laser system integrated with OCT for cataract surgery and aim to enhance further the procedure with lower collateral tissue damage, cleaner, efficient cuts with compact and robust structure.