Room G (201)

Session Title 27G1 / [T08] Atom-Photon Interaction III
Date & Time Thursday, 27 August, 11:00 ~ 12:15
Session Chair Gleb Maslennikov (National Univ. of Singapore, Singapore)

[27G1-1] 11:00~11:30 Invited Talk

Monolithic Optical Integration for Scalable Trapped-ion Quantum Information Processing

Benjamin G. Norton, Moji Ghadimi, Valdis Blum, and David Kielpinski

Griffith University, Australia

Quantum information processing (QIP) promises to radically change the outlook for secure communications, both by breaking existing cryptographic protocols and offering new quantum protocols in their place. A promising technology for QIP uses arrays of atomic ions that are trapped in ultrahigh vacuum and manipulated by lasers. Over the last several years, work in my research group has led to the demonstration of a monolithically integrated, scalable optical interconnect for trapped-ion QIP. Our interconnect collects single photons from trapped ions using a diffractive mirror array, which is fabricated directly on a chip-type ion trap using a CMOS-compatible process. Based on this interconnect, we have proposed an architecture that couples trapped ion arrays with photonic integrated circuits to achieve compatibility with current telecom networks. Such tightly integrated, highly parallel systems open the prospect of long-distance quantum cryptography.

[27G1-2] 11:30~11:45

Efficient Single Photon Collection Using a μ-Fiber-Coupled Microcavity

Chang-Min Lee[1], Hee-Jin Lim[1], Christian Schneider[2], Sebastian Maier[2], Sven Höfling[2,3], Martin Kamp[2], and Yong Hee Lee[1]

[1]KAIST, Korea, [2]University of Wuerzburg, Germany, [3]University of St. Andrews, UK

Efficient single photon collection is demonstrated based on a μ-fiber-coupled photonic crystal cavity. 249 kHz of single photons are detected, and estimated single photon count rate (overall collection efficiency) is 20 MHz (25 %).

[27G1-3] 11:45~12:00

Phase Dependent Light Switching in a Triple-Λ System

Bongjune Kim, Byoung-Uk Sohn, and Hoonsoo Kang

GIST, Korea

We experimentally demonstrate switching can be occurred between D1 |F'=1>, |F'=2> and D2 |F'=2> pulses. Each of pulses is probe field of triple-system composed of 87Rb D1 and D2 transition line.

[27G1-4] 12:00~12:15

Spectro-Spatial Coherent Control of Ultrafast Laser Interaction with Atomic Vapor

Woojun Lee, Hyosub Kim, Kyungtae Kim, and Jaewook Ahn

KAIST, Korea

Spectro-spatial coherent control methods are reported demonstrating optimized resonant two-photon transitions of rubidium atomic vapor by counter-propagating ultrashort pulse pairs. By properly programming the spectral sign changes across resonance frequencies, unlike non-resonant two-photon transitions, the resonant two-photon transitions probabilities could be enhanced, experiment finds.

Room H (202)

Session Title 27H1 / [T09] Novel Materials and Devices
Date & Time Thursday, 27 August, 11:00 ~ 12:30
Session Chairs Yasufumi Fujiwara (Osaka University, Japan)
Dong-Soo Shin (Hanyang University, Korea)

[27H1-1] 11:00~11:30 Invited Talk

ZnO Microcavity Polariton Lasers

Tien-Chang Lu

National Chiao Tung University, Taiwan

ZnO with a large exciton binding energy and oscillator strength shows its advantages in serving active medium in microcavity polariton lasers. Large temperature operation range promises ZnO polaritonics as future highly efficient emitters.

[27H1-2] 11:30~12:00 Invited Talk

True Green and Yellow Low-Threshold II-VI Laser Heterostructures for II-VI/III-N Laser Diode Converters

Sergey Ivanov[1], Sergei Sorokin[1], Sergei Gronin[1], Irina Sedova[1], Aliaksei Vainilovich[2], and Eugenii Lutsenko[2]

[1]Ioffe Institute, Russia, [2]Stepanov Institute of Physics of NAS Belarus, Belarus

We report on recent progress in developing green-yellow (530-590 nm) II-VI/III-N micro-chip laser converters comprising low-threshold (0.8-2.5 kW/cm2) II-VI laser heterostructures with CdSe/Zn(Cd)Se quantum dot active region, optically pumped by InGaN laser diodes.

[27H1-3] 12:00~12:15

Temperature Dependence Photoluminescence of Co-axial ZnO/PVK Nanocables

Sheng-Hung Hsu, Chien-Hung Lin, and Shih-Shou Lo

Feng-Chia University, Taiwan

In this study, we demonstrated an inorganic-organic coaxial nanocable fabricated through facile-coating of organic molecules on an inorganic nanorod. The coaxial nanocable consists of a unique core (ZnO nanorod) and a shell (poly(N - vinylcarbazole)PVK). The temperature dependence of nanocables were carried out.

[27H1-4] 12:15~12:30

E-beam Pumped Mid-ultraviolet Sources Based on AlGaN Multiple Quantum Wells Grown by MBE

Xin Rong[1], S.V. Ivanov[2], V.N. Jmerik[2], V.I. Kozlovsky[3], Guang Chen[1], Fujun Xu[1], Bo Shen[1], and Xinqiang Wang[1]

[1]Peking University, China, [2]Ioffe Physical-Technical Institute, Russia, [3]Lebedev Physical Institute, Russia

We report on the development of e-beam pumped mid-UV (~ 280nm) sources fabricated from AlGaN MQWs grown by plasma-assisted (PA) MBE on AlN/c-Al_{203} templates. The high output power above 100 mW has been demonstrated in a pulse-scanning regime. This achievement is attributed to the enhanced carrier confinement within the high-quality sub-monolayer digital alloying quantum wells and improved quality of the AlN buffer layer due to the high temperature PA MBE growth employed. The time-resolved photoluminescence shows the radiative recombination dominate the recombination process, indicating high crystal qualities.