## Room G (201)

**Session Title** 25G1 / [T08] Quantum Optomechanics
**Date & Time** Tuesday, 25 August, 11:00 ~ 12:30
**Session Chair** Yoon Ho Kim (POSTECH, Korea)

### [25G1-1] 11:00~11:45 Tutorial

**Quantum Optomechanics**

*Warwick Bowen*

*University of Queensland, Australia*

Quantum optomechanics is a rapidly growing field studying the quantum interaction of light with mechanical devices. This tutorial will review the field, as well as applications in precision sensing, quantum information science, and fundamental physics.

### [25G1-2] 11:45~12:00

**An Ion Trap of Monolithic 3D Structure for Quantum Information**

*Dahyun Yum, Ye Wang, Kuan Zhang, Shuoming An, and Kihwan Kim*

*Tsinghua University, China*

We develop a three-dimensional (3D) monolithic ion trap that has advantages of both 3D geometry trap and surface trap. The characteristic properties are measured, i.e. the axial and radial trap frequency and heating rate. We successfully load Yb and Ba ions together in this trap. The hybrid ion trap will be used for quantum information experiment.

### [25G1-3] 12:00~12:15

**Phonon-Phonon Interaction in a Linear Ion Trap**

*Shiqian Ding[1], Gleb Maslennikov[1], Roland Hablutzel[1], Huanqian Loh[1,2], and Dzmitry Matsukevich[1,3]*

*[1]Centre for Quantum Technologies, Singapore, [2]Masssachusets Institute of Technology, USA, [3]National Unversity of Singapore, Singapore*

We observe nonlinear coupling of phonons between radial and axial directions in a system of two ions in a linear Paul trap. Anticrossing of phonon modes and adiabatic energy transfer are demonstrated.

### [25G1-4] 12:15~12:30

**Scalable Trapped-Ion Single-Photon Sources with Monolithically Integrated Optics**

*Mojtaba Ghadimi[1], Valdis Blūms[1], Ben Norton[1], Zulfiqar Hasan Khan[1], Harley Hayden[2], Jason Amini[2], Curtis Volin[2], Erik Streed[1], and David Kielpinski[1]*

*[1]Griffith University, Australia, [2]Georgia Tech Research Institute, USA*

We demonstrate the first fully integrated and scalable diffractive mirrors for efficient ion light collection. We also generated single photons using an $Yb^+$ ion and collected them using these mirrors to do a quantum communication protocol.

## Room H (202)

**Session Title** 25H1 / [T09] Nanostructures
**Date & Time** Tuesday, 25 August, 11:00 ~ 12:30
**Session Chairs** Yuh-Renn Wu (National Taiwan University, Taiwan)
Sang Ho Oh (POSTECH, Korea)

### [25H1-1] 11:00~11:30 Invited Talk

**Growth of Light-Emitting Devices Based on InGaN Quantum Dots by MOVPE**

*Lai Wang, Di Yang, Jiadong Yu, Zhibiao Hao, Yi Luo, Changzheng Sun, Yanjun Han, Bing Xiong, Jian Wang, and Hongtao Li*

*Tsinghua University, China*

In this paper, we reported our recent progresses on growth of InGaN quantum dots and related lightemitting devices by metal organic vapor phase epitaxy.

### [25H1-2] 11:30~12:00 Invited Talk

**III-Nitride Quantum Dot Based Light Emitting Diodes for UV Emission**

*Julien Brault[1], Benjamin Damilano[1], Aimeric Courville[1], Mohamed Al Khalfioui[1,2], Mathieu Leroux[1], Sébastien Chenot[1], Philippe Vennéguès[1], Philippe De Mierry[1], Jean Massies[1], Daniel Rosales[3], Thierry Bretagnon[3], and Bernard Gil[3]*

*[1]CNRS-CRHEA, France, [2]Université de Nice Sophia-Antipolis, France, [3]CNRS-Université Montpellier, France*

$Al_yGa_{1-y}N$-based nanostructures have been fabricated by Molecular Beam Epitaxy and their properties as UV emitters investigated. The structure designs leading to shortest wavelength emission are presented. Quantum dot based LED properties are shown and discussed.

### [25H1-3] 12:00~12:15

**Selective Area Growth of InN Nanocolumns: Effect of Lattice Polarity**

*Ping Wang, Xin Rong, Xiantong Zheng, and Xinqiang Wang*

*Peking University, China*

A weird effect of lattice polarity on the morphology of InN nanocolumns (NCs) via position- and lattice-polarity-controlled selective area growth (SAG) is demonstrated. In-polar and N-polar InN NCs grown on pillar-patterned GaN template were investigated experimentally and theoretically. Growth behaviors and morphology of InN NCs are analyzed, which exhibit different behaviors for opposite polarities, with pyramid growth front and inverted pyramid growth front for the In- and N-polarities, respectively. Theoretical calculation shows that the diffusion barriers of In and N adatoms on (0001) plane are 0.25 eV and 1.20 eV, respectively, which is about 2-fold larger than that of (000 ) plane, resulting in opposite growth behaviors. The polarityinversion phenomenon in In-polar InN NCs provides another strong evidence for the polarity driven growth mechanism.

### [25H1-4] 12:15~12:30

**Green Luminescence of Quasi-Molecular Level in Graphene Quantum Dots Fabricated by Microwave Bottom-up Strategy**

*Min-Ho Jang[1], Sima Umrao[1,2], Jung-Hwan Jung[1], Anchal Srivastva[2], Il-Kwon Oh[1], and Yong-Hoon Cho[1]*

*[1]KAIST, Korea, [2]Banaras Hindu University, India*

Green photoluminescent graphene quantum dots were synthesized by one step microwave assisted method using organic solvent acetylacetone, which have two different light emissions at 460 and 505 nm irradiated by 370 and 470 nm of monochromatic light from Xenon lamp, respectively.