

Award Ceremony

**2021, 2022, 2023
ICO/ICTP
Gallieno Denardo
Award**

14 February 2023, 15:30

Budinich Lecture Hall

Programme

LECTURE BY AWARD WINNER

DAVID HAYRAPETYAN

Generalization of Kohn theorem for lens-shaped quantum dots: Theory and Experiment

The work is devoted to the discussion of specific quantum transitions in a few-particle hole gas, localized in a strongly oblate lens-shaped quantum dot. Based on the adiabatic method, the possibility of realizing the generalized Kohn theorem in such a system is shown. The criteria for the implementation of this theorem in a lens-shaped quantum dot, fulfilled in the experiment, is presented. An analytical expression is obtained for the frequencies of resonant absorption of far-infrared radiation by a gas of heavy holes, which depends on the geometric parameters of the quantum dot. The results of experiments on far-infrared absorption in the arrays of p-doped Ge/Si quantum dots grown by molecular beam epitaxy (MBE) with gradually increasing the average number of holes in the dot are presented. Experimental results show that the Coulomb interaction between the holes does not affect the resonant frequency of the transitions. A good agreement between the theoretical and experimental results is shown.

FMF-based components for mode excitation and conversion in FMF, an effort to enrich the optical component inventory for a complete and better SDM network.

LECTURE BY AWARD WINNER

SUPRADEEPA

VENKATA SUBBAIAH RAMAKRISHNA

Widely Tunable Cascaded Raman Fiber Lasers with Complete Wavelength Conversion

Cascaded Raman fiber laser (CRFLs) are a simple, wavelength agile and power scalable technology. With CRFLs, we can achieve high power laser sources in wavelength bands inaccessible with rare-earth doped fiber lasers. Our research program over the last decade

has been to advance the technology of cascaded Raman fiber lasers in terms of output power, reliability and achieving continuous wavelength tuning with a single laser module. In this talk, we will describe our recent efforts in obtaining a low-intensity noise (<-101dBc/Hz from 9kHz to 10GHz) CRFL with ~ 99% spectral purity over 6 Stokes orders from 1 to 1.5micron. We will also discuss possibilities for narrow-linewidth operation enabling harmonic conversion of the CRFLs to other wavelength regions.

LECTURE BY AWARD WINNER

MUHAMMAD QASIM MEHMOOD

Metadevices: A Promising Route to Ultra-Compact Optical Systems

Reducing the footprint of conventional optical devices/systems is inevitable to meet the ever-growing demands of compactness. Metadevices promise an enormous potential to realize futuristic ultra-compact and high-performance optical systems by bringing their footprint to the chip scale. The recent establishments of companies like metalenz (<https://metalenz.com/>) are evidence of the industrial acceptance of these meta-devices. However, the mass-scale adoption of metadevices will require efficient design procedures (in terms of time and cost), real-time tunability, and the capability of integrating multiple functionalities into a single chip (for an advanced level of compactness) etc. The speaker will talk about the latest trends in the design and development of state-of-the-art metadevices. He will present a few of his highlighted works in these directions and explain the design strategies to achieve the next level of multi-functionality and tunability. He will also explain the real-time utility of such metadevices for various applications like imaging, sensing, communication, etc.

ABOUT THE ICO/ICTP GALLIENO DENARDO AWARD

The ICO/ICTP Gallieno Denardo Award is given annually to researchers younger than 40 years of age from a developing country who have made significant contributions to the field of optics or photonics. The recipient receives a certificate, US \$1,000, and an invitation to participate in and deliver a lecture at an ICTP activity relevant to optics.

CEREMONY PROGRAMME

2021, 2022, 2023

ICO/ICTP Gallieno Denardo Award

Welcome remarks by ICTP Director Atish Dabholkar

Introduction and SPIE-Optica presentations

ICO Presentation of the awards

ICO-ICTP Gallieno Denardo Prize Lectures:

Generalization of Kohn theorem for lens-shaped quantum dots:

Theory and Experiment:

David HAYRAPETYAN (Russian-Armenian University,
Yerevan, Armenia)

Widely Tunable Cascaded Raman Fiber Lasers with Complete
Wavelength Conversion

Supradeepa VENKATA SUBBAIAH RAMAKRISHNA,
(Center for Nano Science and Engineering, IISc Bangalore,
India)

A Promising Route to Ultra-Compact Optical Systems

Muhammad Qasim MEHMOOD (Information Technology
Institute of the Punjab, Lahore, Pakistan)

Group Photo



The recipients of the 2021, 2022, 2023 ICO/ICTP Gallieno Denardo Award are:

2021: David Hayrapetyan Russian-Armenian University, Yerevan, Armenia, for his breakthrough contributions to the theory of semiconductor nanosystems, as well as his promotion of optics and photonics in Armenia under difficult circumstances.

2022: VR Supradeepa, Center for Nano Science and Engineering, IISc Bangalore, India, for his significant contributions to the field of high power fiber lasers and integrated non linear optics, including cascaded Raman fiber

lasers, high power supercontinuum laser sources, and on-chip frequency combs. He has contributed to the promotion of research activities in Optics in India, through the supervision of many PhD students including women and members of unprivileged communities as well as outreach activities for undergraduate students.

2023: Muhammad Qasim Mehmood, Information Technology Institute of the Punjab, Lahore, Pakistan, for his contribution to the field of nanophotonics, in particular plasmonics and metamaterials and for supervising and inspiring many young researchers in Pakistan.