邀请函 | 第十届光学与光电子国际学术会议 (SOPO 2017)

尊敬的_____先生/女士，您好！

第十届光学与光电子国际学术会议(SOPO 2017)将于2017年08月在桂林召开。

大会内容

第十届光学与光电子国际学术会议(SOPO 2017)将于2017年8月18-20日在桂林举行。本届大会将继续遵循学术性、国际性的原则，特邀国内外光学与光电子领域内的学者专家前来参会，并做出精彩的报告。本次大会旨在为行业内专家和学者分享技术进步和业务经验，聚焦光学和光电子学的前沿研究，提供一个交流的平台。

光学与光电子国际学术会议是由武汉大学、北京邮电大学、信息光子学与光通信国家重点实验室、工程信息研究院、科研出版社、千人智库等高校及科研单位共同协办，在领域内享受盛名的国际学术研讨会之一。多年来，已在武汉、成都、苏州、上海、北京、三亚、西安等城市成功举办九届。第十届光学与光电子国际学术会议将于2017年8月18-20日在世界著名的旅游城市桂林举行，诚邀各位专家和代表的参加。

桂林，世界著名的旅游城市、中国首批国家历史文化名城、中国优秀旅游城市，其境内的山水风光举世闻名，千百年来享有“桂林山水甲天下”的美誉。桂林地处广西壮族自治区东北部，是广西最大空港，桂东北地区的政治、经济、文化、交通中心，桂林北接湖南、贵州，西面、南面与柳州市相连，东面与贺州市毗邻，属山地丘陵地区，为典型的“喀斯特”岩溶地貌，遍布全市的石灰岩经亿万年的风化浸蚀，形成了千峰环立，一水抱城，洞奇石美的独特景观。

温馨提示：大会语言是英语，无同声传译。

会议日程

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Part I SOPO 2017 Conference Schedule

Time: August 18-August 20, 2017
Location: Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Date	Time	Lobby, Guilin Golden Dragonball Hotel	
August 18	14:00-17:00	**Registration**	
Date	**Time**	**贵宾 1 号厅 VIP Room 1 4th Floor**	
August 19	08:30-08:40	**Opening Ceremony** **Chair:** Prof. Zhiping Zhou	
	08:40-10:40	**Plenary Speeches** Prof. Gin Jose, Prof. Elfed Lewis, Prof. YoungPak Lee **Chair:** Prof. Zhiping Zhou	
	10:40-10:50	**Group Photo & Coffee Break**	
	10:50-12:00	**Invited Session 1** Prof. Xiaodi Tan, Dr. Yang Yue, Prof. Xiang-hua Zhang **Chair:** Prof. Zhiping Zhou	
	12:00-13:45	**Lunch** Chinese Resturrant. 3rd Floor	
	14:00-18:00	**Invited Session** 2 Prof. Anhui Liang, Prof. Wei Jiang, Prof. You Wang, Prof. Dr. Xuewen Shu, Prof.Jian Wang **Chair:** Prof. YoungPak Lee **Coffee Break:15:30-15:50**	
	18:00-19:30	**Dinner** Chinese Resturrant. 3rd Floor	
Date	**Time**	**贵宾 2 号厅 VIP Room 2, 4th Floor**	**贵宾 6 号厅 VIP Room 6, 4th Floor**
August 20	08:30-12:00	**Invited & Technical Session 1** Prof. Ali Rostami, Prof. Jingsong Li **Chair:** Prof. Ali Rostami **Coffee Break:10:00-10:15**	**Invited & Technical Session 2:** Prof. Lingyu Wan, Prof. Xiaowei Guo **Chair**: **Coffee Break:10:00-10:15**
	12:00-13:30	**Lunch** Chinese Resturrant. 3rd Floor	

Part II Plenary Speeches

Plenary Speech 1: Ultrafast laser plasma doping- a novel approach to photonic materials and devices engineering

Speaker: Prof. Gin Jose, University of Leeds, UK.
Time: 08:40-09:20, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
Surface engineering of material surfaces with plasma generated using a femtosecond laser is an emerging area of research. The ultrafast laser plasma doping(ULPD) developed by my research group has already achieved the engineering of unique functionalities on glass, silicon and polymer platforms. Doping rare earth ions such as Er3+ beyond current material limits in glass and silica-on-silicon has been developed for planar, optically integrated wave guide amplifier and laser engineering. The approach is also highly suitable for integration of active and passive devices on same substrate. The functional glass surfaces are also used for biosensor development and anticounterfeiting of glass packaging. The talk will give an overview of research in this area and various applications under development.

Plenary Speech 2: Optical Fibre Sensors for Underwater and Marine Applications

Speaker: Prof. Elfed Lewis, University of Limerick and IEEE Sensors Council, USA
Time: 09:20-10:00, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
A miniature optical fibre sensor for accurate measurement of pressure (depth) with simu ltaneous and co-located temperature compensation in an underwater/ocean environment is described. The packaged sensor includes an optical fibre Extrinsic Fabry-Perot interferometer (EFPI) combined with a Fibre Bragg Grating (FBG) for the measurement of temperature. The EFPI provides pressure data while the Fibre Bragg Grating (FBG) provides simultaneous temperature measurements. The sensor is mechanically robust, corrosion-resistant and suitable for usein underwater applications. The combined pressure and temperature sensor system has been mountedon-board a number of remotely operated underwater vehicles (ROVs) in order to monitor

the pressure changes at various depths. The reflected optical spectrum from the sensor was monitored online and a pressure and/or temperature change caused a corresponding observable shift in the received optical spectrum. The sensor exhibited excellent stability when measured over a 2 h period underwater and its performance is compared with a commercially available reference sensor also mounted on the ROV. The measurements illustrates that the EFPI/FBG sensor is potentially more accurate for depth measurements (depth of ~0.020 m), can provide accurate simultaneous temperature measurement and can give information on tilt and yaw of the craft.

Plenary Speech 3: Electromagnetic Metamaterial Perfect Absorbers and Hyper-transmitter, based on Super-lens

Speaker: Prof. YoungPak Lee, Hanyang University, Republic of Korea
Time: 10:00-10:40, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
Super-lensing and perfect absorption of electromagnetic (EM) microwaves using metamaterials (MMs) have been studied vigorously recently for the possible applications in EM-wave cautery, hyper-transmitter, super-lens, EM compatibility, solar energy, bolometer, sensor, etc. Perfect absorption of EM microwaves using MMs is a flourishing research field in expecting the potential applications as above. By minimizing the reflectance and eliminating the transmittance, the design and the fabrication of perfect absorbers (PAs) could be realized in various frequency bands, including the GHz and the MHz bands. The problem of EM noise comes to be more serious according to the advent of ubiquitous society. Extended dissemination of high-speed and high-f digital products and smart equipments has made special EM-wave materials used in various fields. We are investigating advanced meta-structures/materials and MMs for EM-wave absorption, MM technology for EM-wave absorption over 99% and ultrawide-band absorption, and MMs for EM-wave absorption independent of incident angle and polarization.

Especially, an efficient resolution for ultrathin MM PA is proposed and demonstrated in the VHF radio band (30–300 MHz). By adjusting the lumped capacitors and the through vertical interconnects, the absorber is miniaturized to be only $\lambda/816$ and $\lambda/84$ for its thickness and periodicity with respect to the operating wavelength (at 102 MHz), respectively. Additionally, we utilized the advantages of the initial single-band structure to realize a nearly perfect dual-band absorber in the same range. The results were confirmed by both simulation and experiment at oblique incidence angles up to 50 °. Our work is expected to contribute to the actualization of future MM-based devices working at radio frequency. It is also experimentally proven that wide-band good MM absorber for EM wave in 8–18 GHz can be manufactured by water-droplet patterning, in other words, with a very ordinary material. Using a planar and flexible MM, we also obtained the low-frequency perfect absorption even with very small unit-cell size in snake-shape structure.

We have realized the tunable MM hyper-transmitter in the microwave range utilizing simple planar meta-structure. The single-layer MM hyper-transmitter shows that the transmission peak appears at 14 GHz. In case of the dual-layer one, it is possible to control the transmission peak from 5 to 10 GHz. Moreover, all the transmission peaks present transmission over 100%. The reason for being over 100% is also understood. The investigated hyper-transmitter can be used in enhancing the operating distance of the EM wave in many kinds of practical applications. This work was supported by the ICT R&D program of MSIP/IITP, Korea (13-911-01-101).

Part III Invited Speeches

Invited Speech 1: High Density Holographic Data Storage System

Speaker: Prof. Xiaodi Tan, Beijing Institute of Technology, China
Time: 10:50-11:20, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
In Big Data era, the demand for large-capacity data storage equipment has been increasing continuously. Holographic data storage (HDS) has the potential of achieving storage density and data rate beyond the limits of conventional optical and magnetic technologies. Collinear HDS system is very promising and differs from conventional 2-axis HDS, because of there are not only large storage capacities and high transfer rates, but also the unique configuration. Collinear holography can produce a small, practical HDS system more easily than conventional 2-axis holography. In this paper, we introduced the principle of the collinear holography and its media structure of disc. Some results of experimental and theoretical studies suggest that it is a very effective method. We also discussed some methods to increase the recording density and data transfer rates of Collinear HDS using phase modulated page data format.
Keywords holographic data storage system, holography, optical memory, volumetric recording, optical disc, high density recording

Invited Speech 2: Technology and Challenge in Packet-Optical Engine

Speaker: Dr. Yang Yue, Juniper Networks, USA
Time: 11:20-11:50, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
During the past few decades, to meet the ever-growing capacity requirement, several degrees of freedom of photon have been efficiently utilized to multiplex low-speed electrical data streams. To further move towards high-speed, low-cost, low-power ethernet, integrated photonics seems to be the only possible route. Packet-optical engine can potentially fuel the optical transport network in a more efficient and manageable manner.

We introduce the latest trend of pluggable optical module form factors, and review the latest progress and challenges of client and line-side packet-optical products in the optical communications and networking industry. Furthermore, we discuss our recent demonstration on a compact solution to timing skew and power imbalance of dual-polarization quadrature amplitude modulation (DP-QAM) transmitter in the packet-optical module. An integrated photodiode can be implemented to perform the function, by simply monitoring the transmitter output power. Fast detection algorithm for arbitrary skew is also proposed and experimentally verified. The scheme is compatible with different modulation formats, flexible data sequences, and variable waveforms.

Invited Speech 3: Glasses for infrared photonics

Speaker: Prof. Xianghua Zhang, CNRS/University of Rennes I, France
Time: 11:50-12:20, Saturday Morning, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
Infrared photonics exploit the longer wavelength region of the electromagnetic spectrum beyond the visible domain. Infrared technology was been dominantly used for defense application, mainly due to the high cost of the systems/components. The progress in uncooled infrared sensors has greatly boosted the commercial/civilian applications of infrared photonics. An excellent example is the fast-growing market of this technology for car driving assistance in poor weather conditions. During decades, progress in the field of infrared optics is very limited. Single crystalline germanium, often associated with ZnSe, is always dominating this market despite of the limited availability of germanium and the expensive fabrication process of ZnSe. Chalcogenide glasses have several obvious advantages over the currently dominant materials; they are less expensive than crystalline Ge or ZnSe because of cheaper raw materials than Ge and more economic fabrication process than ZnSe. Glasses can be conveniently shaped into different complex components such as optical fibers and molded lenses. This talk will summarize the compositions, the fabrication techniques, the most interesting properties as well as their current and potential applications especially for night vision, chemical sensing, and energy conversion

Invited Speech 4: TBD

Speaker: Prof. Anhui Liang, Guangdong University of Technologies, China
Time: 14:00-14:30, Saturday Afternoon, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
TBD

Invited Speech 5: Silicon photonics: how can device physics help?

Speaker: Prof. Wei Jiang, Nanjing University, China
Time: 14:30-15:00, Saturday Afternoon, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
Silicon photonics is making rapid progress in large-scale integration. Compact low-power devices and high density integration are crucial to the further development of silicon photonics. Device physics can play an important role in enabling these advances. Design and analysis of novel micro/nano-structures often require modeling techniques beyond ordinary simulation software. We will explore the underpinning physics to develop analysis and modeling techniques and study such structures towards compact high-performance devices and high integration density. For broader applications, we will show how advanced device physics and design can help to prevent device failure in fabrication. An example will be presented how this led to one-pass fabrication of Si photonic devices on a CMOS fab line that has not done photonics before.

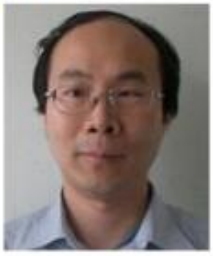
Invited Speech 6: A Diode-Pumped Alkali Laser (DPAL),the Potential High-Powered Laser Source in the Future

Speaker: Prof. You Wang, Southwest Institute of Technical Physics, China
Time: 15:00-15:30, Saturday Afternoon, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
In the recent years, a Diode-pumped alkali vapor laser (DPAL) has attracted much attention because of its potential to achieve high power at near-infrared regions: 895 nm for a Cs laser, 795 nm for a Rb laser, and 766 nm for a K laser, respectively. Diode-pumped alkali lasers have a number of desirable advantages by comparing with solid state or fiber lasers. The quantum efficiency is extremely high (e.g., 95.3% for cesium, 98.1% for rubidium, and 99.6% for potassium as compared to 76% for a 1064 nm Nd:YAG laser) which is very important not only for increasing the overall optical-to-optical efficiency, but also for minimizing problems caused by waste heat. If one wants to scale a solid-state laser to very high power, beam distortions caused by thermally-induced effects with potential for irreversible laser material damage and intrinsic efficiency limitations due to the horrible quantum defect become a serious problem. For a fiber laser, the attempts for realization of high power are often limited by the optical damage at high intensities and by nonlinear effects. For a DPAL, the vapor gain medium does not have such limitations. Since laser medium is in a gas-state, in addition to the promise of high efficiency, there is no issue with damage, beam distortions are very lower in principle, and scaling to high power can be achieved by flowing the alkali vapor inside an enclosed system. The main merits of a DPAL are effective diode pumping, low quantum defect, compact size, nontoxic laser media, and scalability to high power. A DPAL combines the advantages of a diode-pumped solid-state laser such as high power and efficient operation with those of a gas laser as for example high beam quality or the absence of stress birefringence. Therefore, a DPAL provides the outstanding potentiality for realization of a high-powered laser system. It has been demonstrated that a DPAL is now becoming one of the most promising candidates for simultaneously achieving good beam quality and high output power. With a lot of marvelous advantages, a DPAL becomes one of the most hopeful high-powered laser sources of next generation.

Invited Speech 7: TBD

Speaker: Prof. Xuewen Shu, Wuhan National Laboratory for Optoelectronics, China
Time: 15:50-16:20, Saturday Afternoon, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China



Abstract
TBD.

Invited Speech 8: Fiber-Based Orbital Angular Momentum Communications: Transmission and Processing

Speaker: Prof. Jian Wang, Huazhong University of Science and Technology, China
Time: 16:20-16:50, Saturday Afternoon, August 19, 2017
Location: VIP Room 1(贵宾 1 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
Space-division multiplexing (SDM) is a promising technique enabling sustainable information capacity growth of optical communications. Very recently, orbital angular momentum (OAM) accessing the spatial phase structure of lightwaves has attracted increasing interest in SDM-based optical communications. Free-space and fiber-based OAM communications have been demonstrated. In this talk, we will focus on the recent advances in fiber-based OAM communications, covering both OAM transmission and OAM processing. We will first introduce the background, concept and principle, and basic techniques of OAM communications. After briefly introducing recent works on free-space based OAM communications, we will talk about fiber-based data-carrying OAM transmission and fiber-based data-carrying OAM processing. Finally, a brief summary together with future perspective will be given.

Invited Speech 9: Invisibility Cloak Design: Challenges and Solutions

Speaker: Prof. Ali Rostami, University of Tabriz, Iran
Time: 08:30-09:00, Sunday Morning, August 20, 2017
Location: VIP Room 2(贵宾 2 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
As all of us know, invisibility was one of the most important and amazing dreams for mankind and remain still open to realize completely in future. In recent years based on roadmaps presented for material science and engineering, in the past 10 years, the invisibility cloak design was one of hot topics in emerging science and technology. Despite of successful achievements which was recently obtained in this field, a lot of considerable unsolved problemsremain to be practical. In this lecture the invisibility cloak design procedure is generally reviewed and successful reported results are presented too. As an example invisibility cloak design for single frequency in microwave frequency band is demonstrated. The next step in this lecture is extending the invisibility cloak design theory for broad band operation.To this end, the nanocomposite material based multilayer structure, presented by my research group, as novel idea for broadband metamaterial is illustrated. We show that broadband metamaterials using this idea can be realized in whole bands of the electromagnetic spectrum. In this talk by reviewing global

activities, I will introduce my research group achievements for 1-20 GHz in microwave band, 3-5 micrometer in mid infrared band and 400 to 700 nm in visible band. Considering the presented idea, invisibility cloak for broadband operation is proposed and simulated results are discussed and finally those results validated by experimental data. In this talk, we try to introduce this approach as a powerful method for implementation of invisibility cloak in broad band and present our theoretical and experimental obtained results. Finally some of remaining challenges in this field is pointed out for future activities by other researchers.

Invited Speech 10: Quantum cascade laser sensor based dual-spectroscopy techniques for atmospheric trace gases detection

Speaker: Prof. Jingsong Li, Anhui University, China
Time: 09:00-09:30, Sunday Morning, August 20, 2017
Location: VIP Room 2(贵宾 2 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract
A single continuous wave room-temperature quantum cascade laser sensor based on dual spectroscopic techniques was demonstrated and developed for simultaneous measurement of multi atmospheric species (i.e., CO, N2O and H2O). The newly developed detection scheme combines the benefits of absolute concentration measurements using calibration-free direct absorption spectroscopy (DAS) with higher sensitive wavelength modulation spectroscopy (WMS), which offers the possibility of calibration-free trace gases concentration detection with a 3-4 fold improvement in measurement precision and a significant decrease in optimal signal averaging time. By using the DAS calibrated WMS-2f detection scheme, Allan deviation analysis indicates that measurement precision of 1.64 ppb for CO, 1.15 ppb for N2O and 50.4 ppm for H2O was achieved with a 1-s integration time, which can be further improved to 0.21 ppb, 0.18 ppb and 5.65 ppm by averaging up to 75 s.

Invited Speech 11: Study on Extended X-Ray Absorption Fine Structure of Wide Bandgap Semiconductor Materials by a New Method

Speaker: Prof. Lingyu Wan, Guangxi University, China
Time: 08:30-09:00, Sunday Morning, August 20, 2017
Location: VIP Room 6(贵宾 6 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract

The synchrotron radiation X-ray absorption spectroscopy is one of the most powerful techniques to investigate fine structures of materials.Traditionally, people is to analyze original X-ray absorption spectra data based on the Fourier transform and to extract the useful information such as inter-atomic distances,the coordination numbers through a tedious fitting work of back-and-forth.This common method isolates the contributions of the different shells of neighbors and study each shell separately. It may produce an unreliable result for the real signals including the contributions of multiple coordination shells. In this talk, we will present our recent work on investigating the Extended X-Ray Absorption Fine Structure (EXAFS) of several wide band gap semiconductor materials by using a new method proposed by prof. Xu[1] . Our results show that the inter-atomic distances can be obtained quickly without hard fitting and then the distance values give a good guide to the further fitting analysis.

Reference

[1] Gu Xu, Guifang Li,Xianya LI, Yi Liang, Zhechuan Feng. Scientific Reports，7: 42143 (2017), doi:10.1038/srep42143.

Invited Speech 12: Low-temperature, solution processed metal sulfide as an electron transport layer for efficient planar perovskite solar cells

Speaker: Prof. Xiaowei Guo, University of Electronic Science and Technology of China

Time: 09:00-09:30, Sunday Morning, August 20, 2017

Location: VIP Room 6(贵宾 6 号厅), 4th Floor, Guilin Golden Dragonball Hotel (桂林市金龙珠国际大酒店), China

Abstract

Since the pioneering work of Snaith's group(Nature, 2013, 501,395), who demonstrated a simple planar heterojunction solar cell with an efficiency of over 15%, planar perovskite devices have been receiving great attention due to the simplicity in processing. Although the perovskite layers could be prepared at a relatively low temperature (around 100 ℃), most of these highly efficient perovskite solar cells typically have employed high-temperature (>450 ℃) processed TiO2 as an electron transport layer, which signicantly limits the application of perovskite solar cells in a broader range of substrates. Lots of efforts have been made to produce all-low-temperature perovskite solar cells. Snaith's group have developed low-temperature processed anatase TiO2 nano-particles and achieved a maximum power conversion of over 15%. Inverted planar perovskite solar cells with organic charge material PCBM ((6,6)-phenyl-C61-butyric acidmethylester) have also been developed to obtain low-temperature processing conditions. In addition, many groups have demonstrated low-temperature processed n-type semiconductors (ZnO, CdSe) as electron conductors in perovskite solar cells. Such a simple substitution for the TiO2 layer also results in improvements to device performance, greatly showing potential for other similar alternative materials.

In this talk, I introduced all-low-temperature TiO2 -free planar perovskite solar cells, in which n-type TiO2 is replaced with metal sulfide (CdS, ZnS) as an electron transport layer. These metal sulfides have achieved success in the application as buffer-layer materials to CIGS or CdTe solar cells, due to their good optical and electrical properties. Further, they can be deposited through a solution process at low temperature, making it compatible with exible substrates. The feasibility of the perovskite solar cells with a metal sulfide layer was first evaluated using photoemission spectroscopy. The characterization of device performance was carried out under both forward and reverse scans. By applying solution processed CdS as an electron selective layer, the perovskite solar cells with ITO/CdS/perovskite/spiro-OMeTAD/Au planar structures deliver a maximum power conversion efficiency of 11.2% under reverse scans. Our results show the application possibility of more inorganic semiconductor materials, akin to CdS, in perovskite-based solar cells, and also provide the principle for the choice of the electron transport layer for efficient perovskite solar cells.

Part IV Technical Sessions

Invited & Technical Session 1: Optical Communications & Optoelectronic Devices and Integration

Session Chair: Prof. Ali Rostami, University of Tabriz, Iran
VIP Room 2(贵宾 2 号厅), 4th Floor 08:30-12:00, Sunday Morning, August 20, 2017

No.	Paper Title	Author	Affiliation
Invited	Invisibility Cloak Design: Challenges and Solutions	Prof. Ali Rostami	University of Tabriz, , Iran
Invited	Quantum cascade laser sensor based dual-spectroscopy techniques for atmospheric trace gases detection	Prof. Jingsong Li	Anhui University
10049	An Optically Controlled Co-Planar Waveguide Microwave Switch	Alexander Pang	University of Bristol
10051	Photoplethysmogram heart pulse analysis system using Simulink	Junguk Ko	Sungkyunkwan University
10047	Multiwavelength Quantum Cascade Photodetectors	Prof. Ali Rostami	University of Tabriz, Tabriz 5166614761, Iran
01046	Optical circulator based on coupled magneto-optical rods and cavities in two-dimensional photonic crystal	Qiong Wang	Shenzhen University
10:00-10:15	**Coffee Break**		
10058	Ultra-high specific absorption of metallic binary-groove gratings	Yutong Li	Beijing University of Posts and Telecommunications
10060	Color-tunable hybrid white organic light-emiting diodes with double interlayers	Chunhong Gao	Southwest University
10065	Trace hydrogen sulfide gas sensor based on tungsten sulfide membrane-coated thin-core fiber modal interferometer	Dashen Deng	Chongqing University of Technology

10066	Preparation of molybdenum sulfide membrane-coated long period grating and its application in hydrogen sulfide gas detection	Xiang Qin	Chongqing University of Technology
10036	Optical and Network Performance Analysis of XGS-PON system over Active Co-existence PON Systems	Dedy Tarsono	Telekom Research & Development
10039	Controllable Tunneling of Light through a Quantum-Dot-Molecule Dielectric Film via Electromagnetically Induced Transparency	Jian Qi Shen	Zijingang Campus, Zhejiang University
10041	An Improved Algorithm for Pseduo-Jacobi-Fourier Moments	Guleng Amu	Inner Mongolia Agricultural University
10032 (poster)	Frequency entanglement characterization Based on A Mach-Zehnder Interferometer	Yiwei Zhai	National Time Service Center, Chinese Academy of Sciences
10062 (poster)	Study on the concentration inversion of NO&NO2 gas from the vehicle exhaust based on Weighted PLS	Kai Zhang	Chinese Academy of Sciences

Invited & Technical Session 2: Laser Technology and Applications & Medical and Biological Applications

Session Chair: TBD

VIP Room 6(贵宾 6 号厅), 4th Floor 08:30-12:00, Sunday Morning, August 20, 2017

No.	Paper Title	Author	Affiliation
Invited	Study on Extended X-Ray Absorption Fine Structure of Wide Bandgap Semiconductor Materials by a New Method	Prof. Lingyu Wan	Guangxi University
Invited	TBD	Prof. Xiaowei Guo	Sichuan University
10043	The influences of an embedded structure fiber-optic radiation dosimeter in different SSD and beam field size	Yaosheng Hu	Harbin Engineering University

10044	A grinded-angle structure plasmonic optical fiber patterned by template transfer as a nanoprobe for real-time biosensing	Hanyang Li	Harbin Engineering University
10045	The influences of inorganic scintillator optical fiber radiation dosimeter in some conditions	Zhuang Qin	Harbin Engineering University
10054	Novel ECG QRS complex detection	Moo Jung Seo	Sungkyunkwan University
10:00-10:15	**Coffee Break**		
10061	Development of Oblique-Incidence Reflectivity Difference Based on Fast Fourier Transform Algorithm	Ru Chen	Department of Optics Science and Engineering, Fudan University
10035	Test Method of Laser Detection Sensitivity Based on Every Pulse Measurement and Rearrangement	Hao Guo	Luoyang Electronic Equipment Test Center
10038	Generation and propagation of partially coherent pulses trains with non-conventional correlation	Chaoliang Ding	Luoyang Normal University
10022	The Numerical Construction of Competing Effects in Femtosecond Laser Pulse Filamentation Regime in Air	Yuheng Wang	Northwest Institute of Nuclear Technology(NINT)
10042	Terahertz Wave Intensity Modulation by Air Plasma	Tong Wu	Capital Normal University
10024	Mechanism and process of laser ablation in liquid for nanomaterial fabrication	Jun Chen	Nanjing University of Science and Technology
10050	X Perimental Study of Multi Optical Parameter Imaging Technology under the Fog Condition	Weiwei Feng	College of aeronautical engineering Binzhou University Binzhou , China
10025	Single layer cylinder painting scroll unfolding based on terahertz computed tomography	Qiao Wu	Wuhan National Laboratory for Optoelectronics
10023	A New Optical Measurement Method for a	Yang Shang	College of Aerospace

(Poster)	Parallelogram Object's Pose and Shape Parameters		Science and Engineering, National University of Defense Technology

Part V Abstracts

Invited & Technical Session 1: Optical Communications & Optoelectronic Devices and Integration

Article ID: SOPO2017_10049
Title: An Optically Controlled Co-Planar Waveguide Microwave Switch
Name: Alexander Pang
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Abstract
A novel optically controlled CPW microwave switch with good high frequency performance is presented. Numerical electromagnetic modelling is used to design the structure and good agreement between measured and simulated results has been achieved. Isolation is measured to be over 10dB above 15GHz and further simulation predicts a promising isolation value of 25dB at 60GHz.

Article ID: SOPO2017_10051
Title: Photoplethysmogram heart pulse analysis system using Simulink
Name: Junguk Ko
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Abstract
A photoplethysmogram(PPG) is an optically obtained plethysmogram. A PPG is often obtained by using a pulse oximeter which illuminates the skin and measures changes in light absorption. We selected osram SFH7050 as a PPG sensor which has three emitters; infrared, red and green. Green emitter, of which wavelength of peak emission is 525 nm, was mainly used as an illuminator to measure heart pulse by plethysmogram based method.

Article ID: SOPO2017_10047
Title: Multiwavelength Quantum Cascade Photodetectors
Name: Prof. Ali Rostami
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Abstract
In this paper, a quantum cascade photodetector based on intersubband transitions inquantum wells with ability of detecting 1.33μm and 1.55μm wavelengths in two individualcurrent paths is introduced. Multi quantum wells structures based on III-Nitridematerials due to their large band gaps are used. In order to calculate the photodetectorparameters, wave functions and energy levels are obtained by solving 1-D Schrodinger–Poisson equation self consistently at 80 ℃. Responsivity values are about 22mA/Wand 18.75mA/W for detecting of 1.33μm and 1.55μm wavelengths, respectively. Detectivityvalues are calculated as 1.17*107 (Jones) and 2.41*107 (Jones) at wavelengthsof 1.33μm and 1.55um wavelengths, respectively.

Article ID: SOPO2017_01046
Title: Optical circulator based on coupled magneto-optical rods and cavities in two-dimensional photonic crystal
Name: Qiong Wang
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Abstract

In this report, we proposed and numerically investigated optical circulators in two-dimensional photonic crystal by finite-element method. Compact multiport circulators are important in eliminating the feedback of unwanted light in all-optical integratedcircuits. A compact and highly symmetric three-port circulatorwith a magneto-optical cavity and a kind of high-efficiency T-shaped optical circulatorwere designed and demonstrated. The results show that, as shown in the following figure, the single-direction lighttransmission for 120 degree and 90 degree light-bending were achieved by coupling two magneto-optical cavities and rods, respectively. The circulator consideredhere can be used for isolating light reflections and improving system stabilization in designing photoniccrystal integrated circuits.

Article ID: SOPO2017_10058

Title: Ultra-high specific absorption of metallic binary-groove gratings

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Affiliation: State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, 100876, China

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Abstract

A metallic binary-groove gratings, which can be exploited to absorb light at C-band and sense materials with refractive index (1.0-1.2), is proposed and investigated nu-merically. Both ultra-high absorption (99.937%) and sensitivity (1600nm/RIU) are achieved.

Article ID: SOPO2017_10060

Title: Color-tunable hybrid white organic light-emiting diodes with double interlayers

Name: Chunhong Gao

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Abstract

An efficient color-tunable hybrid white organic light-emitting diode is demonstrated with double interlayers of 2,7-bis(carbazol-9-yl)-9,9-ditoylfluorene/2-(diphenylphosphoryl) spirofluorene (DMFL-CBP/SPPO1) in-serted between blue fluorescent and yellow phosphorescent-emitting layers, and ex-hibits Commission Internationale de l'Eclairage (CIE1931) ranging from warm white (0.4368, 0.4497) to cool white (0.2781, 0.2896) with driving current density from 0.2 to 40 mA/cm2. The recombination of singlet and the triplet excitons in blue fluores-cent-emitting layer and yellow phosphorescent-emitting layer, respectively, can be modulated by both the thickness of these double interlayers and the applied current densities.

Article ID: SOPO2017_10065

Title: Trace hydrogen sulfide gas sensor based on tungsten sulfide membrane-coated thin-core fiber modal interferometer

Name: Dashen Deng

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Abstract

A novel fiber-optic hydrogen sulfide sensor based on a thin-core Mach-Zehnder fiber modal interferometer (TMZFI) is demonstrated and fabricated. This in-line interferometer is composed of a short section of thin-core fiber sandwiched between two standard single mode fibers, and the fast response to hydrogen sulfide is achieved via the construction of tungsten sulfide film on the outside surface of the TMZFI using the dip-coating and calcination technique. The fabricated sensing nanofilm is characterized by scanning electron microscopy (SEM) and spectroscopic technology, etc. Experimental results

showed that with the increasing concentration of hydrogen sulfide, the interference spectra appear blue shift. In addition, a high sensitivity of 18.37 pm/ppm and a good linear relationship are obtained within a measurement range from 0 to 80 ppm. In addition, there is an excellent selectivity for H2S, which has also been proved by the surface adsorption energy results of tungsten sulfide with four gases (H2S, N2, O2 and CO2) by using the density functional theory calculations. This interferometer has the advantages of simple structure, high sensitivity and easy manufacture, and could be used in the safety monitoring field of hydrogen sulfide gas.

Article ID: SOPO2017_10066
Title: Preparation of molybdenum sulfide membrane-coated long period grating and its application in hydrogen sulfide gas detection
Name: Xiang Qin
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Abstract
A novel sensor based on long period fiber grating (LPFG) for detection of hydrogen sulfide gas was proposed and experimentally demonstrated. A molybdenum sulfide nano-film incorporating citric acid is constructed onto the surface of LPFG by a sol-gel and dip-coating method, this film with large specific surface area has strong absorption ability. Experimental results show that with the increasing concentration of hydrogen sulfide, the transmission spectrum appear blue shift with time response of 89s. The sensor has the advantages of simple structure, high sensitivity, easy manufacture and low cost, and can be used in indoor gas sensing fields such as factories and laboratories and so on.

Article ID: SOPO2017_10036
Title: Optical and Network Performance Analysis of XGS-PON system over Active Co-existence PON Systems
Name: Dedy Tarsono
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Abstract
We propose an enhanced Reach Extender (RE) called Active Co-existence (ACEX) and investigate its performance with respect to XGS-PON system that co-exist with GPON and TWDM-PON system. The RE is consists of hybrid optical amplifier integrated (EDFA and SOA) with Co-existence Element (CEX) module which is installed at the Central Office (CO) together with the OLT system and act as a booster and pre-amplifier for the downstream and upstream optical signal respectively. The results show that the proposed ACEX is capable to support XGS-PON operation for a maximum distance of 35 km with 128 splitting ratio and up to 44 dB link loss.

Article ID: SOPO2017_10039
Title: Controllable Tunneling of Light through a Quantum-Dot-Molecule Dielectric Film via Electromagnetically Induced Transparency
Name: Jian Qi Shen
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Abstract
Since discrete multilevel transitions of quantum-dot molecules driven by external electromagnetic fields can exhibit quantum coherence effects, such an optical characteristic can be utilized to control propagation of electromagnetic wave through a quantum-dot molecule dielectric film. Since inner-dot tunneling in quantum-dot molecules can be controlled by a gate voltage, destructive quantum coherence among multilevel transitions in quantum-dot molecule would give rise to EIT (electromagnetically induced transparency). In this report, we shall investigate controllable on- and

off-resonance tunneling effects of an incident electromagnetic wave through such a quantum-dot-molecule dielectric film, of which the optical response is tuned by the switchable gate voltage. We have found from the theoretical mechanism that a high gate voltage can cause the EIT phenomenon of quantum-dot-molecule systems, and under the condition of on-resonance light tunneling through the thin film, the probe field will propagation without loss if the probe frequency detuning is zero. By taking advantage of these effects sensitive to the tunable gate voltage, such quantum coherence would be integrated in certain photonic structures, and some devices such as photonic switching and transistors can be designed. Transient evolution of optical characteristics in the quantum-dot-molecule dielectric film (once the tunable gate voltage is turned on or off) is also considered in this report.

Article ID: SOPO2017_10041
Title: An Improved Algorithm for Pseduo-Jacobi-Fourier Moments
Name: Guleng Amu
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Abstract
Image moments have been used in many research fields of the engineering. However, the related computation of invariant moments mostly adopted the polar coordinate system, which not only increase the computational load, but also cause large quantized error. To solve this problem, an improved algorithm to compute Pseudo-Jacobi-Fourier moments in the Cartesian coordinate system is proposed in this paper. The experimental results show that the reconstructed image with improved PJFM's has more advantages than polar coordinate system, such as more information, fewer moments, less time consuming. And the recognition rate of the microscopic images of 8 helminth eggs was also higher than in polar coordinate system.

Article ID: SOPO2017_10032
Title: Frequency entanglement characterization Based on A Mach-Zehnder Interferometer
Name: Yiwei Zhai
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Abstract
In the quantum information processing, frequency entangled biphoton sources by spontaneous parametric down-conversion(SPDC) with a pulsed pump have played an important role. Spectral indistinguishability and degree of frequency entanglement of frequency entangled biphoton sources are two measures to determine the extent of their applications. The spectral indistinguishability characterizes the similarity between the spectral distributions of signal and idler, while the degree of frequency entanglement represents the nonclassical correlation between them. However, these two quantum features have not been successfully measured simultaneously with a single experimental setup. We propose and demonstrate that, due to the inherent group delay difference between the signal and idler photons at the exit of the type-II nonlinear crystal, there will result in a HOM-shape dip at both sides of the center fringed envelope of the MZ interferometric coincidence diagram. By measuring the HOM-shape dip depth, the separation between the two sideband dips as well as the MZ fringed envelope width, both the spectral indistinguishability and the temporal entanglement parameter can thus be simultaneously quantified. This implementation provides us a unified and convenient way to quantify the quantum characteristics of frequency entangled biphoton sources.

Article ID: SOPO2017_10062
Title: Study on the concentration inversion of NO&NO2 gas from the vehicle exhaust based on

Weighted PLS

Name: Kai Zhang
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Abstract

It becomes a key technology to measure the concentration of the vehicle exhaust com-ponents with the absorption spectra. But because of the overlap of gas absorption bands, how to separate the absorption information of each component gas from the mixed absorption spectra has become the key point to restrict the precision of the opti-cal detection method. In this paper, the experimental platform for the absorption spec-trum of vehicle exhaust components has been established. Based on the ultraviolet ab-sorption spectra measured with the platform of exhaust gas NO&NO2, the concentration regression model for the two components has been established with weighted partial least squares regression (WPLS). Finally the each spectral characteristic information of NO&NO2 gas has been separated and the concentration of each corresponding compo-nent has been reversed successfully.

Article ID: SOPO2017_10003

Title: A PSpice Circuit Model for Single-Photon Ava-lanche Diodes

Name: Yuchong Tian
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Abstract

In this paper, we present an improved circuit model for single-photon avalanche di-odes without any convergence problems. The device simulation is based on Orcad PSpice and all the employed components are available in the standard library of the software. In particular, an intuitionistic and simple voltage-controlled current source is adopted to characterize the static behavior, which can better represent the volt-age-current relationship than traditional model and reduce computational complexity of simulation. The derived can implement the self-sustaining, self-quenching and the recovery processes of the SPAD. And the simulation shows a reasonable result that the model can well emulate the avalanche process of SPAD.

Article ID: SOPO2017_10031

Title: Efficiency enhancement utilizing a hybrid cathode buffer layer in OLEDs

Name: Jing Xiao
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Abstract

We report the incorporation of lithium fluoride doped 4,7-diphenyl-1,10-phenanthroline (Bphen:LiF), Al, and molybdenum trioxide (MoO3) which is utilized to form the electron injection buffer layer in single-unit organic light-emitting devices (OLEDs). This hybrid buffer layer at cathode/organic interface was found to be very effective. For comparison, the reference device using conventional cathode buffer layer (LiF) has also been fabricated. The hybrid layer could enhance the electron injection when it was inserted between the organic electron-transporting layer and the Al cathode. With hybrid film, the OLEDs not only showed increased current efficiency but slightly lowered operating voltage compared with reference device. The results strongly indicate that carrier injection ability and balance shows a key significance in device performance.

Article ID: SOPO2017_10018

Title: The surface nanostructures on the InGaN solar cell

Name: Zhen Bi
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Abstract
In order to improve the effective optical absorption of the InGaN based solar cells, the nanostructures on the surface were fabricated by nanoimprint. The nanostructures here act as the light traps to increase the light lengths and make more incident photons to be absorbed. From the reflection and transmittance measurements within the visible range (360nm-800nm), it indicated that the optical absorption obviously improved due to these nanostructures.

Invited & Technical Session 2: Laser Technology and Applications & Medical and Biological Applications

Article ID: SOPO2017_10043
Title: The influences of an embedded structure fiber-optic radiation dosimeter in different SSD and beam field size
Name: Yaosheng Hu
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Abstract
With a rapidly increasing demand and widespread use of radiotherapy treatment, the subject area of in-vivo real time dose rate dosimeters has become a significant area of study. An embedded structure fiber-optic radiation dosimeter has proved to be a promising candidate to fulfil this role because of its high SNR (signal-to-noise ratio) and excellent light conversion efficiency. In this paper, the properties of this kind of dosimeter with respect to different SSD (Source to Surface Distance) and beam field size in a clinical Linac are studied. The characteristics of the dosimeter were evaluated by the sensor's output intensity response in these conditions.

Article ID: SOPO2017_10044
Title: A grinded-angle structure plasmonic optical fiber patterned by template transfer as a nanoprobe for real-time biosensing
Name: Hanyang Li
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Abstract
A grinded-angle structure plasmonic optical fiber patterned by template transfer as a nanoprobe for real-time biosensing was proposed. The nanoprobe was manufactured using template transfer method to integrate a nanohole array onto a grinded tapered angle fiber tip. The former experimental results indicated that at probe grinded angle of 7 ° the nanoprobe has the best sensing performance of refractive indexes, markedly higher than the flat optical fiber tip structure. In this work we further demonstrate a real-time immunoassay relying on our plasmonic fiber which grinded angle is 7 °inte-grated with a special flow cell. The results showed that the stability of the nanoprobe during fiber bending was also excellent.

Article ID: SOPO2017_10045
Title: The influences of inorganic scintillator optical fiber radiation dosimeter in some conditions
Name: Zhuang Qin

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Abstract

In order to meet the increasing demands of modern radiotherapy, real time in-vivo dose measurement has recently attracted significant attention. A small, flexible optical fiber radiation dosimeter , with high signal-to-noise ratio(SNR) that employs inorganic scintillator materials is presented. In this paper, some properties are investigated under special conditions, such as saturation properties when the intensity of the X-Ray is increased and the influence of the temperature of the environment. These properties are important to practical considerations if the sensor is to be successfully deployed in-vivo.

Article ID: SOPO2017_10054
Title: Novel ECG QRS complex detection
Name: Moo Jung Seo
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Abstract

The electrocardiogram (ECG) is a store of body surface potentials generated by the electrical activity of the heart. Clinicians can evaluate an patient's cardiac condition and overall health from the ECG recording and diagnose further. Because of the physiological variability of the QRS complex and many types of noise present in the ECG signal, it is challenging research to accurately detect the QRS complex. The noise sources include power line interference (60Hz), muscle noise, electrode contact noise, and so on. Automatic detection of the QRS-complex in electrocardiogram(ECG) signal is the most important step for ECG coding systems. In this study, A real-time QRS detection algorithm is on the simulink. We take the assumption that the sampling frequency of the input ECG signal is always 200 Hz. However the recorded real ECG data have different sampling frequencies range from 200Hz to 1000Hz. To connect the different sampling frequencies, a sample rate converter is used to convert the sample rate to 200Hz. A buffer is inserted to ensure the length of the input ECG signal is a multiple of the calculated decimation factor of the sample-rate converter. We use the filtering operation to generate a windowed estimate of the energy in the QRS frequency band.

Article ID: SOPO2017_10061
Title: Development of Oblique-Incidence Reflectivity Difference Based on Fast Fourier Transform Algorithm
Name: Ru Chen
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Abstract

Oblique-incidence reflectivity difference (OI-RD) is a special form of ellipsometry, which is able to measure thickness change or dielectric response of the film on the substrate with high sensitivity. OI-RD uses photoelastic modulator which modulates the polarization state at high frequency and harmonic components of modulation frequency are usually measured with two lock-in amplifiers which are bulky and expensive.

Recently we developed a novel OI-RD system which uses Fast Fourier Transform Algorithm (FFT) to replace two lock-in amplifiers for harmonic amplitude measurement. By studying the dependence of OI-RD signal accuracy on FFT sample rate and sample number and the performance comparisons between FFT and lock-in amplifiers, we found that FFT analysis is able to accurately measure OI-RD signals with comparable signal-to-noise ratio under similar working conditions as lock-in amplifier. The advantages of OI-RD system with FFT are: (1) Measuring speed of OI-RD with FFT analysis can be significantly increased without sacrificing signal-to-noise ratio. (2) FFT based measurement shows better performance in less space requirement, less cost and more flexibility. (3) It is straightforward

to extend the FFT approach to spectroscopic ellipsometry and to imaging ellipsometry by using PEM and digital camera, which will definitely extend applications of OI-RD setup.

Article ID: SOPO2017_10035
Title: Test Method of Laser Detection Sensitivity Based on Every Pulse Measurement and Rearrangement
Name: Hao Guo
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Abstract
It is very important to accurately measure the detection sensitivity of laser receiving equipment. Based on the traditional test method of detection probability curve, a new test method is proposed which works through measuring laser pulse one by one.Accurate measurement systems were constructed to improve the accuracy of laser energy measurement and energy regulation. A new data processing method of detection probability curve is put forward, which based on subsection statistics.The new data processing method in effect reduces the light source instability from 6.57% to 0.67%.These works improve the test accuracy of laser receiving detection sensitivity. It is a great support for the accurate evaluation of key technical indices of laser receiving equipment, which subsequently are done by models and simulation.

Article ID: SOPO2017_10038
Title: Generation and propagation of partially coherent pulses trains with non-conventional correlation
Name: Chaoliang Ding
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Abstract
There is considerable interest towards the coherence properties of trains of short pulses, since partially coherent pulse trains are generated by many real sources [1]. Conventionally, the Gaussian Schell model was used to describe partially coherent pulse trains [2]. Recently, by the method of correlation modulation, we have obtained various non-conventional partially coherent pulses trains, which exhibit many interesting propagation properties, such as, self-focusing, pulse splitting and flat-topped intensity [3]-[5]. More recently, we found a method to generate various partially coherent pulses trains with non-conventional correlation. And the primary experimental proof has been observed. These interesting results will be presented in this conference.

Article ID: SOPO2017_10022
Title: The Numerical Construction of Competing Effects in Femtosecond Laser Pulse Filamentation Regime in Air
Name: Yuheng Wang
Affiliation: Northwest Institute of Nuclear Technology(NINT)
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Abstract
In order to shed light on the significance of air or dispersive medium on the outcomes of the laser–matter interaction, we developed a tool ,Ultrashort Pulse Dynamic Code 1.0(UPDyC1.0), applied to simulate the pulse propagation dynamics characteristic, which taking into account a full model[1] based on 2D+1 nonlinear Schrödinger equation (NLSE). As we know, several nonlinear physics mechanisms have competing effects in propagation dynamics which induce to filamentation as the dynamic equilibrium. However, we absolutely have not understood which effect dominates in filamentation regime. Several nonlinear physics effects are considered in this full model which includes High-order Kerr effect (HOKE), Raman Kerr contribution, plasma absorption and defocusing.

Therefore we can reconstruct numerically propagation dynamics phenomenon such as filamentation, self-focusing, conical emission and pulse self-compression using UPDyC1.0. Here, a sequence of numerical tests was carried out for investigation on several competing effects[3-6] contribution on filamentation with respect to different pulse duration which range covers 10-100fs. Then nonlinear optical evolution of propagation in air will be investigated with respect to different incidence power, in situations where incidence power from 0.3Pcr(critical power) to 20Pcr, which indicate self-focusing and defocusing cycles images depending on incidence power in filamentation regime(seeing Fig.1(c-d)).We have compared respectively the contribution of HOKE, plasma defocusing and Raman Kerr effect by means of switching off different terms in model. The results will show HOKE play an important role in filamentation regime, which obviously affects the dynamic equilibrium .

Article ID: SOPO2017_10042

Title: Terahertz Wave Intensity Modulation by Air Plasma

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Abstract

We investigate the wavelength dependence of modulation of a preexisting air plasma to terahertz wave by using a two-plasma configuration in an orthogonal geometry. The terahertz waveforms are recorded by electro-optically sampling method. We find that terahertz signal is gradually decreased with increasing power of modulating pulse, which generated the preexisting plasma, similarly for different wavelengths. In addition, terahertz energy decreases with longer wavelength of the modulating pulse. Possible mechanisms of the results are discussed in terms of the dynamics of tunneling ionization in the air plasma.

Article ID: SOPO2017_10024

Title: Mechanism and process of laser ablation in liquid for nanomaterial fabrication

Name: Jun Chen
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Abstract

For nanomaterial fabrication by laser ablation in liquid (LAL), understanding the mesoscopic process of laser interaction with materials in liquid is very important. We combined time-resolved shadowgraphy and optical beam deflection methods to study the whole process of LAL in pure water and water with nanoparticle products (colloid), which make the results visually and detailedly. For pure water, after laser focuses on the target, the target absorbs the laser energy and creates plasma, shockwave and bubble, accompanying with generation of nanoparticles. For colloid, when laser passes through the solution, it is absorbed by the nanoparticles first and lots of sporadic shadows emerge on the beam path. Afterward, the laser arrives at the target and creates plasma, shockwave and bubble. Meanwhile, the nanoparticle concentration increases and the nanoparticle sizes are modified. The bubble radius and oscillation time are much smaller in the colloid than pure water due to the absorption of the nanoparticles before laser beam arrive at the target surface. Furthermore, we studied the maximum bubble radius and bubble oscillation time at different laser irradiation time (namely different nanoparticles concentration in water). They decrease quickly during laser irradiation times of 0-20 minute, and then the drop rate becomes smaller. In addition, we use the ablation process to explain the size distributions of nanoparticles. This work will deepen our understanding on the mechanism of both laser ablation of bulk targets in liquid and laser irradiation of particles in liquid.

Article ID: SOPO2017_10050

Title: xperimental study of multi optical parameter imaging technology under the fog condition

Name: Weiwei Feng

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Abstract

A multi optical parametric imaging system is introduced and established in order to improve the contrast of object in the fog. A few targets are observed in the fog weather based on the system level radiation model of multi optical parametric imaging and the calibrated model parameters. The results show that the building's windows can be distinguished clear in the linear polarization, circular polarization and angle of polarization images because of the strong reflected polarization light of the glass; The vehicles in intersection can hardly be seen in the intensity image, and it is fuzzy in degree of linear polarization and angle of polarization image because of the doped polarization information of trees near in fog; The circular polarization image raises the contrast of the vehicles by 20% because the circle polarization of the trees is less in the fog.

Article ID: SOPO2017_10025

Title: Single layer cylinder painting scroll unfolding based on terahertz computed tomography

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Abstract

During the recent years, terahertz (THz) imaging technology, especially terahertz computed tomography has been used to investigate and preserve artworks and historic artifacts, due to its properties like penetrating, nondestructive and distinguished.

As the most artworks are fragile and valuable, we present a computed algorithm based on continuous wave terahertz computed tomography (THz-CT) system to unfold single layer cylinder, as a simplified imitation of an oil painting scroll, instead of manual unfolding. A THz-CT system consist of a 300 GHz terahertz source / detector pair and a two dimensional stepping motor is established combined with necessary drive programs. Through iRadon transform algorithm, slices data with 1mm-spacing are obtained, which can be used to reconstruct the object. For each slice, we extract data point along a circular trace with various radius that close to the real sample. By piecing the data together, two-dimensional plane images are generated, through which we can recognize the content carried by oil painting easily without destructive means. Also, extension to scrolls of other materials, especially in the field of historic artifacts and industry is feasible.

Our work offers an effective method to investigate single layer oil painting scrolls and a preliminary guide to future research.

Article ID: SOPO2017_10023

Title: A New Optical Measurement Method for a Parallelogram Object's Pose and Shape Parameters

Name: Yang Shang

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Abstract

A new method to measure the pose and shape parameters of a parallelogram object is presented, which leads to a new conclusion regarding the coplanar perspective of four points problem: If the four points are a parallelogram's four vertices and the distance between two of them is known, a one and only analytical solution will exist for the P4P problem. And if no scale information is known, a scale factor will exist between the real position and

the measurement result. The new measurement method and conclusion were verified by real data experiments.

Article ID: SOPO2017_10016
Title: Efficient and compact Q-switched green laser using graphene oxide as saturable absorber
Name: Jianhua Chang
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Abstract
Abstract
A new type of graphene oxide (GO) is successfully prepared using an improved modified Hummers method. The Raman shift, X-ray diffraction (XRD), and scanning electron microscope (SEM) measurement techniques are used to characterize the GO. An efficient and compact Q-switched green laser based on Nd:YVO4/PPLN is demonstrated with a few-layered GO as the saturable absorber. Our experimental results show that such a few-layered GO saturable absorber allows for the generation of a stable Q-switched laser pulse centered at 532.1 nm with a 3 dB spectral bandwidth of 2.78 nm, a repetition rate of 71.4 KHz, and a pulse duration of 98 ns. The maximum average output power of 536 mW is obtained at the absorbed pump power of 5.16 W, corresponding to an optical conversion efficiency of 10.3%.

Part VI Instructions for Presentations

Oral Presentation

Devices Provided by the Conference Organizing Committee:

- Laptops (with MS-office & Adobe Reader)
- Projectors & Screen
- Laser Sticks

Materials Provided by the Presenters:

- PowerPoint or PDF files

Duration of each Presentation:

- Regular Oral Session: 15-20 Minutes of Presentation
- Plenary/Invited Speech: 30-40 Minutes of Presentation

Poster Presentation

Materials Provided by the Conference Organizing Committee:

- X Racks & Base Fabric Canvases (60cm ×160cm, see the figure below)
- Adhesive Tapes or Clamps

Materials Provided by the Presenters:

- Home-made Posters

Requirement for the Posters:

- Material: not limited, can be posted on the Canvases
- Size: smaller than 60cm ×160cm
- Content: for demonstration of the presenter's paper

Part VII Hotel Information

About Hotel

The Golden Dragonball Hotel (Jin Longzhu Guoji Dajiudian) is situated in central Guilin not far from popular natural scenery like Elephant Trunk Hill. The hotel's restaurant serves both Western and Chinese cuisines. A café with a wide choice of coffee and dessert is a great place for guests meeting friends. Business-related needs are well catered to with the business center and conference room. Moreover, Wi-Fi access is available in public areas.

Address: 17 Longzhu Road (Longzhu Lu), Diecai Distrcit, Guilin, China
(桂林市叠彩区龙珠路 7 号，桂林市金龙珠国际大酒店)
Tel: 0773—2560000
Fax: 0773-2819555
Website: http://www.jlzhotel.com/

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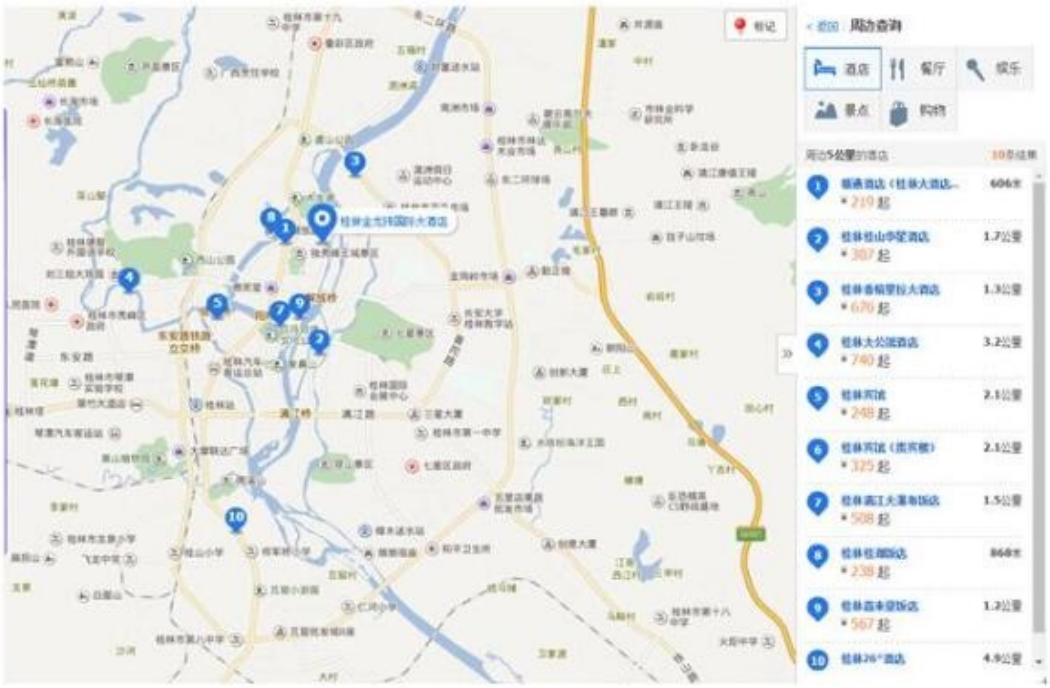

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参会费包含内容：

1. 可参加所有会场
2. 会议期间午餐（8月19,20日）
3. 会议期间晚餐（8月19日晚）
4. 会议期间茶歇
5. 会议指南及会议期刊各一本

备注：

• 5人以上报名可享受团体优惠，请联系会务组。

• 请于2017年7月31日之前完成所有注册缴费步骤，否则视为撤稿，不予安排参会事宜。

温馨提示：大会语言是英语，无同声传译。

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2017年8月11日