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Part I Conference Schedule

Time: December 1- 3, 2018

Location: International Asia-Pacific Convention Center Sanya

三亚亚太国际会议中心

Date	Time	Lobby		
Dec. 1	14:00-17:00	Registration		
Date	Time	Macao Room(澳门厅)	Tokyo Room(东京厅)	HongKong Room(香港厅)
Dec. 2	08:30-12:00	Biomedical & Life Sciences Invited Speech Session 1: Chair: Prof. Anthony J. Clarke Group photo & Coffee Break: 10:00-10:15	Physics Sciences Invited Speech Session 1: Chair: Prof. Vladimir Arabadzhi Group photo & Coffee Break: 10:00-10:15	Laser and Optoelectronics Invited Speech Session 1: Chair: Group photo & Coffee Break: 10:00-10:15
	12:00-13:30	Lunch Pacific Cafe (太平洋咖啡厅)		
Date	Time	Macao Room(澳门厅)	Tokyo Room(东京厅)	HongKong Room(香港厅)
Dec. 2	14:00-18:00	Biomedical & Life Sciences Invited Speech Session 2 Chair: Prof. Sharif Maraghi Group photo & Coffee Break: 16:15-16:30	Physics Sciences Invited Speech Session 2: & Technical Session 1 Chair: Prof. Remi Leandre Group photo & Coffee Break: 16:15-16:30	Laser and Optoelectronics Invited Speech Session 2: Chair: Prof. Ping Xue Group photo & Coffee Break: 16:15-16:30
	18:00-19:30	Dinner Pacific Cafe (太平洋咖啡厅)		
Date	Time	Macao Room(澳门厅)	HongKong Room(香港厅)	
Dec. 3	08:30-12:00	Biomedical & Life Sciences Technical Session 1: Chair: Group photo & Coffee Break: 10:00-10:15	Physics Sciences Technical Session 2: Chair: Prof. Shengjun Zhou Group photo & Coffee Break: 10:00-10:15	
	12:00-13:30	Lunch Pacific Cafe (太平洋咖啡厅)		

Part II Invited Speech

Biomedical & Life Sciences: Invited Speech Session 1

Invited Speech 1: Battle between virus and host immunity: the role of type I interferon signaling in HCV and HBV persistent infections

Speaker: Prof. Limin Chen, Chinese Academy of Medical Sciences, China

Time: 08:30-09:15, Sunday Morning, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Host innate immunity, characterized by the activation of type I interferon signaling and NK cells, poses the 1st line of defense in many virus infections. Using cDNA microarray gene expression profiling, we successfully identified an 18-gene response signature that predicts whether a given patient will respond to the interferon-based therapy or not with 96% accuracy. Most of these genes are interferon stimulated (sensitive) genes (ISGs) and they are all up-regulated in treatment non-responders. We therefore identified an “ISG high” non-responder phenotype characterized by the over-activation of type I IFN signaling leading to increased expression of ISGs, especially ISG15/USP18 ubiquitin-sigaling pathway. Similar findings were observed in HBV non-responders. Further evidence on how increased ISGs affect treatment response status will also be discussed.

Invited Speech 2: The Structure-Function Relationship and Inhibition of Peptidoglycan O-Acetyltransferases, Potential New Antivirulence Targets in Both Gram-Positive and Gram-Negative Bacteria

Speaker: Prof. Anthony J. Clarke, University of Guelph, Canada

Time: 09:15-10:00, Sunday Morning, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The O-acetylation of the essential bacterial cell wall polymer peptidoglycan is known to occur in a large number of bacteria including many important human

pathogens, such as *Staphylococcus aureus*, species of *Enterococcus*, *Helicobacter pylori*, *Campylobacter jejuni*, and *Neisseria gonorrhoeae*. This modification to the C-6 position of N-acetylmuramoyl residues of peptidoglycan inhibits the action of muramidases (lysozymes) of innate immune systems in a concentration dependant manner, and it totally precludes the activity of the lytic transglycosylases, bacterial autolysins that are involved with the insertion of flagella, pili, and secretion/transport systems, as well as the general biosynthesis and turnover of the peptidoglycan sacculus. We discovered and characterized two distinct two-component systems for the O-acetylation of peptidoglycan in Gram-positive and Gramnegative bacteria, respectively. In Gram-negative bacteria, such as *N. gonorrhoeae*, an integral membrane protein, peptidoglycan O-acetyltransferase (Pat) A, is proposed to translocate acetate from cytoplasmic pools of acetyl-CoA through the cytoplasmic membrane to the periplasm for its transfer to peptidoglycan by PatB. With Gram-positive bacteria, such as *S. aureus*, a single protein, Oacetyltransferase (Oat), appears to be a fusion of PatA and PatB to catalyze both the translocation and transfer of acetate for peptidoglycan O-acetylation. The first biochemical characterization and X-ray crystal structure of *N. gonorrhoeae* PatB and the C-terminal catalytic domain of OatA (OatAC) from *S. pneumoniae* and *S. aureus* are presented. The kinetic parameters for various acetyl donors and acceptors were determined for these O-acetyltransferases using a chromogenic assay coupled with MS analysis. These data indicated that both PatB and OatAC use a ping-pong, bi-bi catalytic pathway for acetyl transfer to acceptor sugars. A novel PG-based substrate was used to delineate the unique specificities for the two enzymes which account for their different temporal activities in PG metabolism. The structures of both enzymes adopt an α/β hydrolase fold comparable to SGNH esterases, and Ser-His-Asp catalytic triads were identified within active site grooves on their respective surfaces. However, a unique oxyanion loop-orientation compared to other SGNH esterases was found. Site-specific replacements confirmed the identification of these catalytic residues. The structure of OatAC was also determined in complex with a mechanism-based inhibitor covalently bound to the catalytic Ser. A mechanism of action is proposed for these O-acetyltransferases involving the formation of an acetyl-enzyme intermediate prior to the acetylation of muramoyl residues in PG. Additionally, preliminary evidence supporting the principle that these enzymes may serve as new antibiotic targets will be presented.

Invited Speech 3: Development of C-based single domain antibodies as therapeutic candidates against infectious diseases

Speaker: Prof. Rui Gong, Wuhan Institute of Virology, Chinese Academy of Sciences, China

Time: 10:15-11:00, Sunday Morning, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Monoclonal antibodies have been successfully used for the therapy of many diseases. However, because of their large size (~150 kD), many limitations have also been found during their development and manufacture. The use of antibody fragments with smaller sizes is one of

the attractive strategies to overcome these limitations. Antibody constant CH2 domain (~12 kD) was proposed as scaffold for library construction and selection of specific binders as novel therapeutic candidates termed C-based single domain antibodies (C-sdAbs). The isolated CH2 is a monomeric, independently folded domain with solved crystal structure, which contains seven β -strands connected by three loops (loopBC, loopDE, loopFG) and two helices. In our previous work, we engineered the native CH2 scaffold (m01s) for improve its stability and extension of its serum half-life to about 10 hours. Panning of a phage display library based on m01s against a peptide from HIV-1 envelope protein resulted in identification of a binder m2a1 that could interact noncompetitively with an HIV-1 neutralizing epitope and neonatal Fc receptor. We further modified m01s to increase its aggregation resistance. Then, we constructed a new library based on m01s mutant which has complexities in excess of 10^{10} independent clones. Panning of this library against the glycoproteins (Gps) from several viruses such as Ebola virus (EBOV) and Middle East respiratory syndrome coronavirus (MERS-CoV) resulted in selection of several specific binders. Among these binders, 7C2 could bind to EBOV Gp with EC_{50} of about 40 nM and neutralize VSV Δ G*-EBOVGP pseudovirus. Further competition ELISA disclosed that 7C2 had overlapping epitope with single chain format of 13C6 (scFv-13C6) (a component of Zmapp). 2B6A05 and HUE11, targeting the receptor binding domain (RBD) in the MERS-CoV spike glycoprotein, could neutralize pseudotyped MERS-CoV with potency of IC_{50} in nanomole range. Therefore, the C-sdAb technique platform could be very useful in screening of new candidate drugs for prophylaxis and treatment of infectious diseases.

Invited Speech 4: Reverse transcriptase recombinase polymerase amplification assay for rapid detection of tick-borne encephalitis virus infection

Speaker: Prof. Xiaoping Kang, Beijing Institute of Microbiology and Epidemiology, China

Time: 11:00-11:45, Sunday Morning, December 2, 2018

Location: Macao Room (澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Tick-borne encephalitis virus (TBEV) is spread widely in China and can cause severe encephalitis disease. Currently, immunofluorescence assays (IFA) or real-time reverse-transcription polymerase chain reaction (rRT-PCR) are used to confirm TBEV infection. These assays take up to a few hours to complete. Therefore, a rapid diagnostic assay is imperative for TBEV diagnosis. In the current study, a rapid nucleic acid assay based on recombinase polymerase amplification (RPA) was developed to specifically detect TBEV. Assay sensitivity was determined using RNA isolated from virus-like particles (VLP) and wild-type TBEV Senzhang strain and Mudanjiang strain. The sensitivity was 10 copies/reaction for VLP, and 0.01 plaque-forming units/reaction for TBEV. Assay specificity was confirmed using RNA isolated from flaviviruses related to TBEV, including dengue virus, West Nile virus, Japanese encephalitis virus and Zika virus. The sensitivity and specificity of RT-RPA were comparable to those of rRT-PCR. Performance of

the RT-RPA assay was evaluated in parallel with that of rRT-PCR by testing sera and cerebrospinal fluid samples from suspected TBEV patients. The same results were obtained using rRT-PCR and RT-RPA. Hence, because of its rapidity, ease of use and reliance on portable devices, the developed RT-RPA assay may potentially be used in a countryside hospital setting.

Biomedical & Life Sciences: Invited Speech Session 2

Invited Speech 5: Morphologic, morphometric and molecular characterization of Anisakids obtained from edible fish in Bushehr region, Iran

Speaker: Prof. Seyed Mahmoud Sadjjadi, Shiraz University of Medical Sciences, Iran

Time: 14:00-14:45, Sunday Afternoon, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Background: Anisakid nematodes belong to a number of ascaroid species that normally infect the stomach and intestines of various marine fishes, birds, and fish-eating mammals. **Objectives:** A study was made in order to investigate morphological and molecular characterization of ascaroid nematodes obtained from ten edible fishes in the Bushehr region, Persian Gulf, Iran. **Methods:** A total of 519 fish belonging to 10 different species were captured from April to Sept 2016. The ascaroid larvae were detected from fishes by dissection. Different techniques including microscopic, molecular, pepsin assay and histopathology were applied for characterization of different species and strains of ascaroid L3 larvae.

Results: A total of 2119 Ascaroid larvae, including 1793 (%85) *Hysterothylacium* spp, 105 (%5) *Anisakis* type I, 11 (%0.5) *Anisakis* type II and 210 (%10) as another member of the ascaroid family were detected. The greatest prevalence and intensity of ascaroid infection were recorded for *Suridatambil* with %42.85 and the intensity up to 55 for *Scomberomorus commerson* respectively. There was a significant correlation between prevalence of larvae infection and fish length ($P < 0.0001$). Sequencing of the ribosomal internal transcribed spacer (ITS) regions, the mitochondrial cytochrome C oxidase subunit II (Cox2) and Restriction Fragment Length Polymorphism (RFLP) using *Hinf*I and *Hha*I enzymes revealed *Hysterothylacium* spp as the most dominant isolated nematode. The phylogenetic tree was constructed using appropriate gene data of ITS and COX2 genes. Presence of *Anisakis* type I and *Hysterothylacium* spp in *Suridatambil* and *Psettodes erumei* filets was also confirmed by pepsin assay digestion and histopathology.

Conclusion: The presence of *Hysterothylacium* spp, *Anisakis* type I and *Anisakis* type II was confirmed in the edible fishes in the Persian Gulf region which are a potential for human-infecting in this region.

Invited Speech 6: Dirofilariasis in Iran

Speaker: Prof. Sharif Maraghi, Ahvaz Jundishapur University of Medical Sciences, Iran

Time: 14:45-15:30, Sunday Afternoon, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Authors: S. Maraghi¹, S. M.Sadjjadi²

1-Institute of Health Research Center, Thalassemia and Hemoglobinopathy Research Center.Infectious and Tropical Diseases Research Center.Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

2- Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.

Dirofilariasis is a worldwide mosquito born zoonotic disease caused by species of the genus *Dirofilaria* in a wide range of carnivores, especially dogs and cats are the known as definitive and humans act as accidental hosts. Among all *Dirofilaria* species, the most relevant are *D. immitis* and *D. (Nochtiella) repens* due to their severe pathological effects and their high prevalence and incidence. Transmission of the parasites occur through blood sucking female mosquitoes. *D. immitis* produces both canine and feline cardiopulmonary dirofilariasis, whereas *D. repens* causes both canine and feline subcutaneous dirofilariasis. In addition, *D. immitis* and *D. repens* are responsible for human pulmonary and subcutaneous/ocular dirofilariasis, respectively, throughout the world.*D. immitis* is more present in areas with temperature and tropical climates. There are also reports on existence of heartworm in Jakals in in some European countries. In Iran, *D. immitis* has been reported in canids from different parts of the country and in human as case reports. *D. repens* are reported from human in various parts of the world. The first human case of dirofilariasis due to *D. repens* in Iran has been reported from north of the country in 1995 and till now many cases of subcutaneous and ocular dirofilariasi in humans have been reported from different regions of Iran. Human ocular onchocerciasis caused by *Onchocercalupi* also has been reported from Iran. Incidental detection of imported case of LF due to *Wuchereriabancrofti* in an Indian worker in Iran has also been reported.

Keywords: *Dirofilarisimmitis*, *Dirofilaria repens*, Dirofilariasis, heartworm

Invited Speech 7: Assessment on Free Fatty Acid of Crude Palm Oil using Near-Infrared Spectroscopy

Speaker: Prof. Herlina Abdul Rahim, Universiti Teknologi Malaysia, Malaysia

Time: 15:30-16:15, Sunday Afternoon, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Near infrared (NIR) spectroscopy has always been of great interest in the food and agriculture industries. The development of predictive models has facilitated the estimation process in recent years. In this research, 176 crude palm oil (CPO) samples were studied. A FOSS NIRSystem was used to take absorbance measurements from the sample. The wavelength range for the spectral measurement is taken at 1600nm to 1900nm. Free fatty acid (FFA) content of each sample was determined by chemical titration method and prediction models were developed relating FFA value to spectral measurement. Prediction model built from Artificial Neural Network (ANN) yielded R of 0.9999 and 0.9640 for the calibration and validation set respectively. From the results, it is shown that the NIR spectroscopy in a spectral region of 1600nm to 1900nm is suitable and adequate for FFA measurement of CPO and that the accuracy of prediction is high (range from 80.39% to 99.99% of accuracy). There is no doubt that ANN predictive model is the best among all prediction model.

Invited Speech 7: TBD

Speaker: Prof. Jean-luc Maeght, Institute of Ecology and Environmental Sciences, France

Time: 16:30-17:15, Sunday Afternoon, December 2, 2018

Location: Macao Room(澳门厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

TBD

Physics Sciences: Invited Speech Session 1

Invited Speech 1: Bulk Acoustic Wave Metal Oxide Gas Sensors

Speaker: Prof. Junhui Hu, Nanjing University of Aeronautics and Astronautics, China

Time: 08:30-09:15, Sunday Mornig, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

We have proposed and reported the bulk acoustic wave metal oxide gas sensor, which is capable of enhancing the metal oxide gas sensor's sensitivity by at least one order of magnitude by utilizing the ultrasonic molecular manipulation technology. In the sensor system, a bulk acoustic wave is employed to drive the target gas molecules to the sensing layer to promote the oxidation-reduction reaction between target gas molecules and reactive oxygen species on the sensing layer surface. It provides a new way to effectively enhance the sensing resposne of a conventional metal oxide gas sensor. In this report, we give the detailed sensing characteristics and working mechanism of this type of gas sensor, as well as its potential applications.

Invited Speech 2: Resonant Vibrations for Diagnostic Imaging of Defects in

Composite Materials

Speaker: Prof. Igor Solodov, University of Stuttgart, Germany

Time: 09:15-10:00, Sunday Mornig, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Traditional acoustic methods of nondestructive materials inspection consider attenuation and scattering of high-frequency (MHz range) waves as the primary effects of its interaction with defects. The efficiency of acoustic wave-defect interaction relevant to damage detection and imaging can also be quantified by the amplitude of the defect vibration for given amplitude of a driving wave. The increase in local vibration of the damaged area is a key factor for enhancing efficiency and sensitivity of the so-called derivative effects in acoustic wave-defect encounter. They include e.g. nonlinear, thermal, acousto-optic, etc. responses also applied for acoustic imaging of damage. These secondary effects are normally relatively inefficient so that the corresponding testing techniques require an elevated acoustic power and stand out from conventional acoustic counterparts for their specific instrumentation particularly adapted to

high-power ultrasonics. In this presentation, a new approach to imaging of damage in composites is discussed based on frequency-selective activation of defects by means of Local Defect Resonance (LDR). A frequency match to the damage resonance provides an efficient energy delivery directly to the defect. Unlike the resonance of the entire specimen, LDR addresses the impact of the defect severity to its own resonance response, which is far stronger and identifies (even possibly quantifies) the damage by its resonant response clearly distinguished and independent of the rest (intact) part of the specimen. The objective of the talk is to demonstrate that the frequency- and spatially-selective activation of defects via the concept of LDR is the way to boost efficiency and sensitivity of diagnostic imaging of damage. Multiple case studies to be considered include resonant imaging of various defects in composite materials via laser vibrometry, thermosonics, and nonlinear acoustic techniques.

Invited Speech 3: On the Alternative Approach to Active Control of Sound, Radiated and Scattered by Body in Water

Speaker: Prof. Vladimir Arabadzhi, Institute of Applied Physics (RAS),
Russia

Time: 10:15-11:00, Sunday Mornig, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building,
International Asia-Pacific Convention Center Sanya



Abstract

The possibilities of applying high spatial-temporal resolution operations (sensors and actuators) in linear problems of active control of radiation and scattering of low-frequency broadband sound by physical bodies of neutral buoyancy in water are considered. Neutral buoyancy of the body in the water causes the absence of a mechanical support (no vibrostats, and, in addition, no any real rigid boundary for sound in water) and the absence of an inertial coordinate system for measuring the normal displacements of the body surface. The traditional approach to active compensation of radiation and scattering fields assumes the existence of complete information about the fields and the boundary wave problem. In practically important cases, this approach requires the accumulation of a vast array of information about the vibroacoustic characteristics of the body by the self-learning system. On the other hand, for a long time of accumulation of this information, it can become obsolete due to changes, for example, temperature or hydrostatic pressure (the depth of immersion of the body). The solution methods proposed in the report do not require the accumulation (due to the use of pulsed unidirectional radiation sources) of complete information on the boundary-value problem and are based on a stable technological tendency to increase the speed and miniature of the element base. Possible tools are faster miniature microphones (as well as accelerometers and capacitive thickness sensors), faster piezoelectric drives, faster computers with a high numerical representation of numbers. On the other hand, the frequencies of the waves to be damped remain low, as they were many years ago, due to the constancy of the natural conditions of long-range propagation of these waves. The proposed approach provides almost instantaneous system response

to any the disturbing effect without requiring knowledge of the spectral characteristics of the fields (frequency, wavelength) and vibro-acoustic characteristics of the protected body (of neutral buoyancy) as intermediate data between sensors and actuators. The system under consideration consists of two subsystems: (a) a system for forming a given normal displacement of the surface of the protected body, (b) a system for the direction-finding of the incident waves in the form of a finite set of plane (on the scale of body size) waves with different directions and arrival times. In this case, each incident wave is accompanied by a corresponding group of microphones, formed directly in the process of contact between the leading edge of the wave and the microphones. This system can't be reduced to the traditional combination of electrical circuits with constant parameters and, accordingly, the elements of such a system can't be effectively described by complex amplitudes (amplitude plus phase). The consideration is based on time representation of boundary problem with initial conditions.

Invited Speech 4: Bismut's way of the Malliavin Calculus in the non Markovian case: an introduction.

Speaker: Prof. Remi Leandre, University of Bourgogne-Franche-Comte, France

Time: 11:00-11:45, Sunday Morning, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

This talk does a review on our last works on stochastic analysis where there is no stochastic process besides. It is divided in the following parts: -)In the first part, we perform Malliavin Calculus when there is a formal stochastic differential equation besides and establish by this way the existence of an heat kernel for fourth order generator. Malliavin matrix plays a key role. -)In part II, we establish Malliavin Calculus for big order generator when there is no formal stochastic differential equation besides and by using deeply the symmetry of the considered differential operator of big order, we show the existence of an heat kernel. No Malliavin matrix appears. -)In part III, we give a Bourbaki style meaning of part II, by considering a general class of rightinvariant elliptic pseudodifferential operator on a compact Lie group. -)In part IV, we perform the perturbation of a general elliptic pseudodifferential operator by a fractional power of it in order to establish the full relationship between Malliavin Calculus and the theory of pseudodifferential operator. -)In part V, we perform large deviation estimates for non Markovian semigroup, which enters in the theory of W.K.B. estimates but with different type of limit theorem. -)In part VI, we do the marriage of part V and the previous parts (according the beautiful requirement of Bismut's book "Large deviation and the Malliavin Calculus") in order to establish some logarithmic estimates of the considered heat kernels in small time.

A lot of of these results are classical in analysis but the method is new.

Physics Sciences: Invited Speech Session 2

Invited Speech 5: Multiple ionization induced by highly charged heavy ions in collisions near the Bohr velocity

Speaker: Prof. Xianming Zhou, Institute of Modern Physics, Chinese Academy of Sciences, China

Time: 14:00-14:45, Sunday Afternoon, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The interaction between highly charged ions and solid targets has attracted substantial attention in recent years due to its fundamental importance and interesting applications [1-3]. In the low-energy region, many works have been carried out focusing on the evolution of the hollow atoms by analyzing the high-resolution X-ray spectroscopies with a crystal, and the classical over-barrier model has been established to understand such behavior. In the high-energy region, lots of experimental works have been done about the inner-shell ionization by measuring the X-ray production cross section, and many theories have been developed to describe such process. However, the experimental and theoretical investigation of the ionization and neutralization for the projectile in the collisions near the Bohr velocity is rare.

Near the Bohr velocity, the projectile, having enough kinetic energy, can interact with the target atoms at a close distance below the surface. In addition to neutralization, it may be ionized. Not only the inner-shell ionization, but also the outer-shell may be multiply ionized. On one hand, this causes the energy shift of the corresponding X-ray and the change of the relative intensity of sub-shell X-rays. On the other hand, this may result in the enhancement of the X-ray fluorescence yield, as the Auger electron emission and Coster-Kroing (CK) transition rate are diminished because of the absence of the outer-shell electrons. In addition, the inner-shell binding energy of the projectile is enlarged by a decrease of the screening generated by a decrease number of the outer-shell electrons. So, it is proposed that the effect of charge state on binding energy should be considered in calculating the inner-shell X-ray production cross section. Here, we would like to present the investigation of evolution of Ar¹¹⁺ ions in collisions near the Bohr velocity.

Reference :

- [1] D. Mitra, M. Sarkar, et al., Nucl. Instr. Meth. B 268 (2010) 450
- [2] J. Reyes-Herrera, J. Miranda, Nucl. Instr. Meth. B 267 (2009) 1767
- [3] T. Schenkel, A.V. Hamza, A. V. Barnes, D. H. Progress in Surface Science. Rep 61 (1999) 23

Invited Speech 6: Unsteady Flow and Pressure Pulsations in Bladed Machines

Speaker: Prof. Sergey Timushev, Moscow Aviation Institute (National Research University), Moscow, Russia

Time: 14:45-15:30, Sunday Afternoon, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Bladed machines operation is accompanied by pressure pulsations in flow paths and by hydrodynamic vibration of structure members. Great attention is paid to measurements and control of a level of pressure pulsations and vibration both in operation and, in particular, during development testing. Pressure pulsations and vibration bear information on the dynamic stresses the engine structure members are subjected to. Dynamic stresses imposed on the effective static stresses result in fatigue failure of structure members. The higher are static and dynamic stresses, the more likely is the fatigue failure of a member and the shorter is non-failure operation life of the unit. A unique dependence between dynamic stresses, acting in specific members, and measured pressure pulsations and vibrations is usually unknown. A permissible level of pressure pulsations and vibration is determined experimentally in bench tests. Many studies both in Russia and abroad were dedicated to investigation of working fluid pressure pulsations, vibration and noise of centrifugal pumps and other turbomachines. The experimental data have shown direct relationship between pressure pulsations in the bladed machine flow path and its vibration-noise characteristics. The presence of intensive pressure pulsations is typical for all types of centrifugal pumps and other radial turbomachines. Under certain conditions the pressure pulsations in the centrifugal pump outlet, for example, in outlet volute may reach the values hazardous for the structure integrity. The study of pressure pulsations in the pump cavity gives information on variable loads, acting on structure members, it has been found during measurement by strain gauges of dynamic stresses at leading edges of guide vanes of the centrifugal pump that in the range of flow rates of 0.6 – 1.0 of its optimal value the dynamic stresses are directly proportional to the amplitudes of pressure pulsations. Physical-and-mathematical model of pulsating flow in the centrifugal pump developed by taking into account non-linear character of oscillations generation process and acoustic nature of their propagation in the working circuit of the pump.

Keywords

Unsteady Flow, Pressure Pulsations, Hydrodynamic Vibration, Bladed Machine, BPF Component, Acoustic-Vortex Decomposition

Invited Speech 7: Protection of materials and structures from space radiation environments on spacecraft

Speaker: Dr. Zicai Shen, Beijing Institute of Spacecraft Environmental Engineering, China

Time: 15:30-16:15, Sunday Afternoon, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International As ia-Pacific Convention Center Sanya



Abstract

Spacecraft in orbit will encounter space radiation environments such as electron, proton, heavy ions, gamma ray, etc, and results in space radiation effects such as single event effects, total ionizing dose effects, displacement damage effects, surface charging and discharging or electrostatic discharging, internal charging effects, so protection from space radiation should be given to the spacecraft. The protection principle and validity from space radiation environments on spacecraft is introduced firstly, and then from three dimensions such as material, subsystem and spacecraft, protection materials and structures such as mass shielding material, ESD protection material, radiation hardening functional material, local protection structure, whole-spacecraft protection structure, are discussed. At last, some development directions on protection material and structure from space radiation environments are proposed.

Keywords: space radiation environment; protective material; protective structure; spacecraft

Invited Speech 8: Ultrasonic hydrogen sensors based on graphene sensitive layers

Speaker: Dr. Li Fan, Nanjing University, China

Time: 16:30-17:15, Sunday Afternoon, December 2, 2018

Location: Tokyo Room(东京厅), 3rd Floor, Conference Building, International As ia-Pacific Convention Center Sanya



Abstract

Ultrasonic sensors are one type of acoustic devices which can be used to detect trace level substances based on perturbation of acoustic transmission induced by absorbed substances on the surfaces of sensitive layers. Due to the advantages of high sensitivities, small bulks, high integration, wide application fields, and etc., ultrasonic sensors have been give high consideration in the fields of sensors and acoustics. Here, we report an ultrasonic sensor using graphene as the sensitive layer, which is designed to detect trace level hydrogen. The sensor is created on the basis of LiNbO₃ piezoelectric material. Hummers method is adopted to grow a graphene sensitive layer on the surface of a LiNbO₃ substrate and

platinum is used as a catalyst. Experimental results show that the sensor can response to hydrogen with a volume concentration of merely 5ppm, which exhibit an extremely high sensitivity. Additionally, we measure the sensitivity under different working conditions and find that the background gas and humidity exert influences on the performance of the hydrogen sensor.

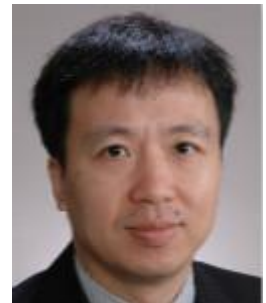
Laser and Optoelectronics: Invited Speech Session 1

Invited Speech 1: Novel techniques for multi-dimensional imaging of biological samples in vivo

Speaker: Prof. Nanguang Chen, National University of Singapore, Singapore

Time: 08:30-09:15, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Focal Modulation microscopy (FMM) is an emerging technique for molecular imaging in deep tissues. By combining spatial filtering with focal modulation, we are able to drastically improve the signal-to-background ratio. As a result, a penetration depth three times greater than confocal microscopy can be achieved. Recently we have been working on further improving FMM in terms of image acquisition speed. We have developed line scan focal modulated microscopy, a proprietary technique highly suitable for in vivo imaging of small animal models such as zebrafish and mouse. It features parallel illumination and parallel detection, leading to much improved imaging speed. A prototype line scan FMM has been built and we have demonstrated an imaging speed of 100 frames per second without compromising optical sectioning. In vivo imaging of the zebrafish heart has been carried out and high-quality multi-dimensional images have been reconstructed.

Invited Speech 2: Band structure and optical properties of cubic CsSnBr₃ perovskite nanoplatelets

Speaker: Prof. W. J. Fan, Nanyang Technological University, Singapore

Time: 09:15-10:00, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Here we will review our recent work on the all-inorganic lead-free cubic CsSnBr₃ perovskite band structure simulation. We report a new simple 8-band k.p method to calculate the band structure and optical properties of cubic CsSnBr₃ bulk perovskite and their nanoplatelets (NPLs). The bulk inversion asymmetry is taken into consideration in our model. The band splitting caused by the bulk inversion asymmetry is observed at non-R point. The optical transition rule follows the $\Delta n=0$ for the thin NPLs, however, for the thicker NPLs, the optical transition rule of $\Delta n=0$ does not hold. The results are helpful to understand the cubic perovskite based spintronics and optoelectronics.

Acknowledgements: W.J. Fan would like to thank funding support from Singapore MOE AcRF Tier 1 RG87/17.

Invited Speech 3: Fitting background and modulation light to 2-D polynomials of degree K for self-calibrating phase-shifting interferometry

Speaker: Prof. Cruz Meneses-Fabian, Physics and Applied Physics Bachelor, FCFM-BUAP, Mexico

Time: 10:15-11:00, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia -Pacific Convention Center Sanya



Abstract

Phase-shifting interferometry (PSI) and generalized phase-shifting interferometry (GPSI) are methods very well studied and established for phase retrieval. They consist mainly in resolving a $N \times 3$ system of equations, where $N > 3$ is the number of interferograms changed in known phase-steps, and the unknowns are background, modulation, and object phase. Nevertheless, in order to carry out PSI or GPSI it is necessary to exhaustively calibrate a phase-shifter. Self-calibrating generalized phase-shifting interferometry (SGPSI) offered an alternative to the necessary calibration with PSI or GPSI. In SGPSI the phase-steps are typically introduced by a miscalibrated phase shifter and are considered unknown and unequal. In this talk, it is presented an accurate, robust, and non-iterative algorithm classified as SGPSI. It is based on the approximation of background and modulation light to 2-D polynomials of degree K by applying the least squares method. The present algorithm supports high spatial variations in the illumination, and the interferograms can have any number of fringes and can be open and closed.

Invited Speech 4: Advanced ultrafast laser sources harnessing fiber-optic

nonlinearities

Speaker: Prof. Guoqing Chang, Institute of Physics, CAS, China

Time: 11:00-11:45, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building,
International Asia -Pacific Convention Center Sanya



Abstract

Propagation of strong femtosecond pulses inside an optical fiber causes fiber-optic nonlinearities and results in numerous interesting nonlinear optical phenomena. We employ fiber-optic nonlinearities to improve the performance of ultrafast fiber lasers. The resulting novel ultrafast laser sources promise important applications in multiphoton microscopy imaging and high-power mid-infrared frequency combs.

Invited Speech 5: Power enhancement in a two-stream free electron laser

Speaker: Prof. Nader Mahdizadeh, Islamic Azad University, Iran

Time: 11:45-12:30, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building,
International Asia -Pacific Convention Center Sanya



Abstract

By the nonlinear formulation power enhancement is treated by a tapered wiggler in a two-stream Free Electron Laser (FEL). For small axial magnetic field and Group I trajectories the wiggler field was tapered downward in order to achieve an efficiency enhancement. Wave-particle interaction is described by a set of nonlinear coupled differential equations in 1D approximation. The scaled vector potential correspond to the out-put power is plotted versus scaled axial distance. It is found, the output power may be enhanced to a level of almost 99.2%.

Laser and Optoelectronics: Invited Speech Session 2

Invited Speech 6: Femtosecond laser fabricated optical waveguide in optical fibers and its applications in optical fiber sensors

Speaker: Prof. Dongning WANG, College of Optical and Electronic Technology, China Jiliang University, Hangzhou, China

Time: 14:00-14:45, Sunday Morning, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Femtosecond laser micromachining is a powerful tool for optical fiber device fabrication. Various types of optical fiber gratings, fiber in-line interferometers and other optical fiber microstructures have been developed. Recently, in-fiber waveguide has been successfully fabricated by use of femtosecond laser, which helps in construction of many types of optical fiber in-line interferometer devices. This talk will report on the progress of femtosecond laser fabricated optical fiber in-line interferometers based on in-fiber waveguide and its sensing applications.

Invited Speech 7: Ultrahigh speed optical coherence tomography

Speaker: Prof. Ping Xue, Tsinghua University, China

Time: 14:45-15:30, Sunday Afternoon, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Optical coherence tomography (OCT) may provide depth-resolved information of bio-tissues with micron-scale resolution in a non-invasive manner and therefore has been widely used in clinic. Nowadays, there is an increasing need for real-time volumetric imaging in OCT-based clinical diagnosis. However, to realize real time 3D optical coherence tomography imaging, there are still several challenges in optical source, detection scheme, data processing and etc., due to the acquisition and processing of massive data of >10 GB/s required by real time 3D display. In this talk, I will discuss and demonstrate some new progress related to these challenges, including linear-in-wavenumber swept laser source and all-optical Fourier transformation system for real-time massive data processing.

Keywords: optical coherence tomography, compressed sensing, high speed imaging, 4D-OCT, optical computing OCT

Invited Speech 8: Dual-comb ranging

Speaker: Dr. Guanhao Wu, Tsinghua University, China

Time: 15:30-16:15, Sunday Afternoon, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building,
International Asia-Pacific Convention Center Sanya



Abstract

Absolute distance measurement is widely used in high-accuracy manufacturing. The advent of the optical frequency comb has led to revolutionary progress in absolute distance measurement. Dual-comb ranging (DCR) is an emerging tool that exploits phase resolution and frequency accuracy for high-precision and fast-rate distance measurement. Using two coherent frequency combs, dual-comb ranging allows time and phase response to be measured rapidly. It breaks through the limitations related to the responsive bandwidth, ambiguity range, and dynamic measurement characteristics of conventional ranging tools. In this talk, I will introduce TOF-based dual-comb ranging, including principles of system and parameter optimization, and discusses synthetic wavelength interferometry and carrier wave interferometry in a DCR system in the absence of phase noise and intensity noise, and also discusses these noise sources and methods for realizing a low-noise DCR.

Invited Speech 9: Imaging over scattering media based on second-order coherence

Speaker: Prof. Weitao Liu, National University of Defense Technology, China

Time: 16:30-17:15, Sunday Afternoon, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building,
International Asia-Pacific Convention Center Sanya



Abstract

Based on autocorrelation of speckle patterns behind scattering media, the image of objects can be retrieved, based on optical memory effect. At the same time, ghost imaging allows to obtain image of an object via signal from a single-pixel detector, based on second-order correlation of the illumination fields, being more powerful against scattering media than traditional active optical imaging. We try to compare between both imaging techniques considering second-order coherence of light fields. Although information of the objects is obtained in different ways, the feature of speckle patterns plays key role in both techniques. That is, second-order coherence of such field appears as a kind of resource which can be used for attracting information of objects, even through strong scattering. Based on this, we propose an approach to take

advantages of both techniques, such that imaging within a large field of view under strong scattering can be successfully achieved. Our technique is experimentally verified.

Invited Speech 10: Recent advances in few mode fibers for mode-division multiplexing

Speaker: Prof. Hongjun Zheng, School of Physics Science and Information Technology, Liaocheng University, China

Time: 17:15-18:00, Sunday Afternoon, December 2, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

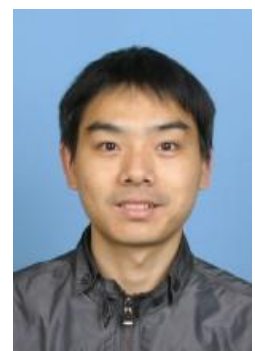
In recent years, mode-division multiplexing (MDM) using few-mode fibers (FMF) have been intensively investigated as the method to increase transmission capacity beyond the nonlinearity Shannon limit of single-mode fibers (SMF). FMFs have drawn much attention in optical communications. In this invited presentation, recent progress in FMFs will be reviewed, including fiber design and characteristics, as well as the wide applications. We firstly review some types of FMFs such as elliptical-core FMF for MIMO-less data transmission, polarization-maintaining FMF composed of a central circular-hole and an elliptical-ring core, polarization -maintaining PANDA ring-core FMF (PM-PRCF), low-loss ring-core FMF and FMF with supermodes. Then, we propose several novel FMFs such as a graded index FMF with Low loss and low mode crosstalk, ring core FMF with supermodes, multi-core FMF with supermodes. Finally, we demonstrate an optical transmission system based on FMF for the front-haul transmission.

Invited Speech 11: High-brightness GaN-based visible and ultraviolet light-emitting diodes

Speaker: Prof. Shengjun Zhou, Wuhan University, China

Time: 08:30-09:15, Monday Morning, December 3, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

GaN-based light-emitting diodes (LEDs) have been applied in many areas, such as backlights for liquid crystal displays (LCDs), solid-state lighting, visible light communications, head-up displays, and optogenetics. The internal

quantum efficiency of GaN-based blue LEDs has been above 85%. However, the light extraction efficiency of GaN-based blue LEDs is relatively low due to total internal reflection (TIR) of the generated light at the GaN/air interface resulting from their very different refractive indices. This talk will outline the emerging challenges in design and fabrication of light extraction micro/nano-structure for high efficiency LEDs. Research in developing efficient light extraction micro/nano-structures, such as surface roughening, patterned indium-tin oxide (ITO) transparent conductive layer, patterned SiO₂ current blocking layer, cone-shaped patterned sapphire substrate, wavy sidewalls, sidewall nano-prisms, embedded air void microstructure, distributed Bragg reflector (DBR), laser lift-off, nanoscale Ni/Au wire grid, and flip-chip technology, will be discussed. In addition, the recent development in green LEDs and ultraviolet LEDs will also be discussed in this talk.

Invited Speech 12: Sub-Cycle Coherent Optical Waveforms

Speaker: Prof. Shaobo FANG, Institute of Physics, Chinese Academy of Sciences, Beijing, China, China

Time: 09:15-10:00, Monday Morning, December 3, 2018

Location: HongKong Room(香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Waveform Nonlinear Optics aims to study and control the nonlinear interactions of matter with custom-tailored sub-optical-cycle waveforms. In this regime, the time-evolution of the optical electric field deviates strongly from a sinusoidal carrier-wave oscillation within a single cycle of light, so that the usual approximations of nonlinear optics break down, and new phenomena and opportunities arise. In this work, we present a prototype parametric synthesizer architecture to overcome pulse-energy and average-power bottlenecks. These intense optical waveforms custom-sculpted within an optical cycle are expected to open up new horizons for controlling strong-field interactions in atoms, molecules and solids.

Part III Technical Sessions

Biomedical & Life Sciences: Technical Session 1

Session Chair:

Macao Room(澳门厅), 3rd Floor, Conference Building

08:30-12:00, Monday Morning, December 3, 2018

ID	Paper Title	Author	Affiliation
08:30-08:45	Age- and Gender-Specific Changes in Thyroid Size and Thyroid Function Test Values of Euthyroid Subjects	Tika Ram Lamichhane	Tribhuvan University
08:45-09:00	The Role of MAPK4 in Acute Lung Injury	Lin Xu	Zunyi Medical University
09:00-09:15	Consensus gene modules identification of cervical cancer and head neck cancer	Ki-Yeol Kim	Dental Education Research Center, BK21 PLUS Project, Yonsei University College of Dentistry, Yonsei University
09:15-09:30	Transcriptome analysis of the innate immune response in <i>Drosophila melanogaster</i> during aging	Xianda Hu	Beijing Tibetan Hospital, China Tibetology Research Center
09:30-09:45	Indication of cold-active extracellular enzymes of bacteria isolated from sea water and soils in Russia	Marina Sidorenko	1Federal Scientific Center of East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Science, Russia
09:45-10:00	Pyruvate cycle increases aminoglycoside efficacy and provides respiratory energy in bacteria	Yubin Su	Sun Yat-sen University
10:00-10:15	IFN- α Enhances Adenoviral Vector FMDV Vaccine Immune Response by promoting Memory Tfh Cells	Chunxia Su	Ningxia Medical university
10:15-10:30	The effect of TLR7 agonist Imiquimod on Tfh cell differentiation in MRL/lpr Mice	Xiangguo Duan	Ningxia Medical university

10:30-10:45	Coffee Break		
10:45-11:00	Identification of Host Factors in Dengue Virus-Human Protein-protein Interactions	Suzana Misbah	School of Fundamental Science, Universiti Malaysia Terengganu, Kuala Nerus, 21030 Terengganu, Malaysia
11:00-11:15	Aspirin inhibit cell proliferation and induce its apoptosis via Tigit/Bcl-2/Bax in colon cancer cell	Qiunan Zhou	Ningxia Medical University
11:15-11:30	Investigation of Streptococcus pyogenes carriage in population vulnerable to scarlet fever during 2015-2017 in Shanghai, China	Mingliang Chen	Shanghai Municipal Center for Disease Control and Prevention
11:30-11:45	Early Warning System of Risk in Dairy Cows with Inactive Ovaries	Chang Zhao	Heilongjiang Bayi Agricultural University
11:45-12:00	Sero-Prevalence of Toxoplasmosis (Toxoplasma gondii) in Small Ruminant Population of District Sahiwal, Punjab, Pakistan	Muhammad Imran	University of Agriculture
12:00-12:15	Prevalence of Anaplasmosis among Dairy Cattle and the Challenges for its Control in Bahrain	Abdalla Fadlalla AZRUG	Central Veterinary Laboratory, Agriculture and Marine Resources Affairs, P.O.Box: 251, Manama
12:15-12:30			

Physics Sciences: Invited Session 2 & Technical Session 1

Session Chair: Prof. Remi Leandre, University of Bourgogne-Franche-Comte, France

Tokyo Room(东京厅), 3rd Floor, Conference Building 14:00-18:00, Sunday Afternoon, December 2, 2018

ID	Paper Title	Author	Affiliation
Invited Speech 14:00-14:45	Multiple ionization induced by highly charged heavy ions in collisions near the Bohr velocity	Prof. Xianming Zhou	Institute of Modern Physics, Chinese Academy of Sciences, China
Invited Speech	Unsteady Flow and Pressure Pulsations in Bladed Machines	Prof. Sergey Timushev	Moscow Aviation Institute (National

14:45-15:30				Research University), Moscow, Russia
Invited Speech 15:30-16:15	Protection of materials and structures from space radiation environments on spacecraft	Dr. Zicai Shen		Beijing Institute of Spacecraft Environmental Engineering, China
16:15-16:30	Coffee Break			
Invited Speech 16:30-17:15	Ultrasonic hydrogen sensors based on graphene sensitive layers	Dr. Li Fan		Nanjing University, Nanjing, China
17:15-17:30	Performance of Floor Impact Sound Insulation Layer Composed of Scrambled TPU and EVA	Bonsoo Koo		Daelim Industrial Company
17:30-17:45	Physical and Numerical Modeling of Pressure Pulsations in the Guide Diffuser and Volute of a Screw-Centrifugal Pump	Prof. Sergey Timushev		School of Astronautics Beihang University (BUAA), Beijing, China
17:45-18:00	Crack localization using transmissibility of operational deflection shape and its application in cantilever beam	Li Xingzhan		Institute of Mechanical Manufacturing Technology, China Academy of Engineering Physics
18:00-18:15	Damage cross-section for neutron-irradiated 15-15Ti steel	Nadezda Korepanova		Institute of Modern Physics
18:15-18:30	Environmental Radiation Measurement and Assessment	Chariette Nandi-Esom	Ereh	Nuclear Science & Technology, Harbin Engineering University, Harbin-China
18:30-18:45	Multiple ionization cross sections of Ne and CO induced by very high-q fast projectiles ($q/v > 1$)	Haoxing Zhou		Rocket Force University Of Engineering, Xi'an, P.R.China

Physics Sciences: Technical Session 2

Session Chair: Prof. Shengjun Zhou, Wuhan University, China

HongKong Room(香港厅), 3rd Floor, Conference Building 8:30-12:00, Monday Morning, December 3, 2018

ID	Paper Title	Author	Affiliation
Invited Speech 08:30-09:15	High-brightness GaN-based visible and ultraviolet light-emitting diodes	Prof. Shengjun Zhou	Wuhan University, China
Invited Speech 09:15-10:00	Sub-Cycle Coherent Optical Waveforms	Prof. Shaobo FANG	Institute of Physics, Chinese Academy of Sciences, Beijing, China, China
10:00-10:15	Coffee Break		
10:15-10:30	Compressing Electron Pulse with Alternating Electric Field	Chao Wang	Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences
10:30-10:45	Optical system design of telescope based on mixed modulation diffractive lens	Fei Li	University of Science and Technology of China
10:45-11:00	Principle and application of spatial-spectral interference in ultra-short laser facilities	Jie Mu	Laser Fusion Research Center, China Academy of Engineering Physics
11:00-11:15	Study on the Coupling Efficiency of Large Mode Area Double-clad Photonic Crystal Fiber Based on Zemax and Trace Pro Software	Zhaoyu Zong	Laser Fusion Research Center, Mianyang, China
11:15-11:30	Beam and target alignment at the ICF laser device using a new grid target	Xiaolu Zhang	Laser Fusion Research Center of CAEP
11:30-11:45	A study on the control method of complex vector optical field with near-field conformal	Xibo Sun	Research Center of Laser Fusion, China Academy of Engineering Physics
11:45-12:00	Low-spatial coherence high-power electrically injected 6xx nm dual-emitter laser	Wanhua Zheng	Institute of Semiconductors, Chinese Academy of Sciences

12:00-12:15	Control of femtosecond filamentation in fused silica using pulse-shaping technology	Zuoqiang Hao	Changchun University of Science and Technology
12:15-12:30	Clarification of the role of leading and tailing pulse edges in filamentation and supercontinuum generation in transparent media	Tingting Xi	University of Chinese Academy of Sciences

Part IV Technical Sessions Abstracts

Biomedical & Life Sciences

ID: CABMB2018_10000

Title: Age- and Gender-Specific Changes in Thyroid Size and Thyroid Function Test Values of Euthyroid Subjects

Name: Tika Ram Lamichhane

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Abstract:

BACKGROUND: The thyroid status is evaluated by two clinical diagnostic tests which are thyroid ultrasonography and thyroid function tests. The objective of this research is to critically analyze the age and gender based variations of thyroid volume and thyroid hormone levels in the hospital based euthyroid subjects. **METHODOLOGY:** A total of 221 euthyroid subjects aged 1-86 years were selected to observe the normal thyroid size by ultrasonography at Department of Radiology and the thyroid function test values (FT3, FT4 and TSH) of 2413 euthyroid subjects aged (<1)-93 years were observed at Department of Biochemistry, Tribhuvan University Teaching Hospital, Kathmandu, Nepal during January 2017 to February 2018. The observed data were analyzed graphically and statistically to check the cross-correlations among the variables. **RESULTS:** The best fitted equations with significant correlation coefficients and $p < 0.05$ provide the empirical relations between any two of the observed variables: age, thyroid lobe volumes, FT3, FT4 and TSH. The mean \pm SD ($p < 0.0001$) of thyroid volume, FT3, FT4 and TSH are 4.74 ± 2.30 mL, 5.46 ± 0.82 pmol/L, 14.09 ± 2.71 pmol/L and 2.30 ± 0.98 mIU/L, respectively. **CONCLUSION:** The thyroid size first increases and then decreases whereas the thyroxin level first decreases and then increases with aging. Left lobe volume is almost same for both genders and right lobe volume is higher in males. The thyroid size in menarche and menopause periods of females is larger than that of

males. Such age- and gender-specific changes recommend the new reference ranges for the normal thyroid functions.

ID: CABMB2018_20000

Title: The Role of MAPK4 in Acute Lung Injury

Name: Lin Xu

Affiliation: Zunyi Medical University

Email: xulinzhouya@163.com

Abstract:

Background: Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) are characterized by extensive inflammation, and may develop as complications of severe trauma and sepsis. Previous works have shown that mitogen-activated protein kinase (MAPK) subfamilies (such as ERK, JNK, p38 MAPK) played important roles in the pathology of ALI. However, the potential role of MAPK4 in the development of ALI remains to be elucidated. **Objective:** To detect the effect of MAPK4 deficiency on the pathology of murine ALI, and preliminarily explore its mechanism. **Methods:** Murine ALI model was established by intraperitoneal injection of Lipopolysaccharide (LPS) in WT or MAPK4^{-/-} mice. Then, the survival ratio of mice was observed and the pathologic damage of lung tissues was observed by HE staining. Moreover, the body weight, lung weight index, lung wet-dry ratio and protein concentration in BALF were detected, respectively. Furthermore, the expressions of related cytokines were analyzed by Real-time PCR and ELISA. And the numbers of immune cells in bronchoalveolar lavage fluid (BALF) was analyzed by FCM. Finally, the expression levels of related signaling pathway molecules such as p-AKT, p-JNK, p-p38 MAPK and p-MK5 were measured by WB. **Results:** The expression of MAPK4 was

upregulated in lung tissues of murine ALI model. Then, MAPK4^{-/-} mice exhibited less mortality. Moreover, the pathological damage in lung tissues was significantly alleviated. Real-time PCR and ELISA results showed that the levels of pro-inflammatory cytokines IL-1 β , IL-6 and TNF- α were significantly decreased, meanwhile, the expression levels of TGF- β , IL-10 and IL-4 obviously increased. Furthermore, the numbers of various immune cells in BALF, including innate immune cell DCs, $\gamma\delta$ T cells and neutrophils, as well as adaptive immune cell CD4⁺T cells and its subsets markedly decreased, respectively. Finally, the expression levels of p-AKT, p-JNK and p-p38 MAPK, as well as p-MK5, decreased obviously in MAPK4^{-/-} mice. Conclusion: MAPK4 deficiency could ameliorate the pathology of murine ALI, indicating it plays an important role in the development of ALI.

ID: GC2018_10000

Title: Consensus gene modules identification of cervical cancer and head neck cancer

Name: Ki-Yeol Kim

Affiliation: Dental Education Research Center, BK21 PLUS Project, Yonsei University College of Dentistry, Yonsei University

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Abstract:

Squamous cell carcinoma (SCC) is the most common histological type of head neck cancer and cervical cancer. Carcinogenesis in these two types of cancers demonstrate similar multistep progression. The purpose of the study is to identify the significant consensus gene modules of these two cancers.

We used a publicly available expression dataset for the study. The dataset included head neck cancer (42 cancer samples and 14 normal samples) and cervical cancer (20 cancer samples and 8 normal samples). We used only human papilloma virus 16 positive samples for excluding the bias according to the different types of HPV. We identified consensus modules of two types of cancers and explored the biological functions of each modules by annotation tool.

We identified 8 consensus gene modules of head neck cancer and cervical cancer. Each module was well preserved between the two types of cancer. The modules included significant biological functions, including ATP binding and extracellular exosome.

Consensus gene module identification is expected to contribute to more personalized management of multiple cancer types. The identified consensus modules could be common targets for multicancer therapy.

ID: GC2018_10003

Title: Transcriptome analysis of the innate immune response in *Drosophila melanogaster* during aging

Name: Xianda Hu

Affiliation: Beijing Tibetan Hospital, China Tibetology Research Center

Email: hellocean@hotmail.com

Abstract:

Objective: Dysfunction of immune responses is a common feature of various neuropathological conditions. Activated innate immune is pervasive phenomenon among aging animals. This study is focus on exploring the innate immunity in brain during aging. Methods: Transcriptome datasets of different age of *Drosophila melanogaster* brains were collected from the NCBI GEO database. Genes related to the innate immune system were annotated by FlyBase. The gene expression profiles were used to estimate the states of innate immune response in drosophila brain during aging. Results: The expression levels of antimicrobial peptides were generally upregulated remarkably with age, while C-type lectins or lysozymes were remaining essentially unchanged. Moreover, the expression quantity of most antimicrobial peptides related factors, such as immune induced molecules (IMs), microbial recognition receptors, including peptidoglycan recognition proteins (PGRPs) and gram-negative binding proteins (GNBPs), major molecules involve in Toll and immune deficiency (IMD) pathways also elevated in different degrees with increase of age, but there was no significant change among Jak/Stat

pathway molecules. Conclusion: The transcriptome data demonstrated that the gene expression of antimicrobial peptides, but not C-type lectins or lysozymes, increased significantly in drosophila brain during aging. The mechanism could related to the growing expression of PGRPs, GNBP, as well as molecules of Toll and IMD signaling pathways. These findings indicated that antimicrobial peptides could play important physiological and pathological roles in brain during aging. The biological functions of antimicrobial peptides and correlated molecules in aging are worthy of experimental studies.

ID: CMVI2018_10003

Title: Indication of cold-active extracellular enzymes of bacteria isolated from sea water and soils in Russia

Name: Marina Sidorenko

Affiliation: 1Federal Scientific Center of East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Science, Russia

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Abstract:

Studies of microorganisms in the modern world are very active, accumulated a large amount of information about the ecology, evolution and applications of microorganisms. Microorganisms are known for their diverse abilities and playing roles in the biodegradation of organic matter in natural ecosystems. Enzymes produced by microorganisms have many advantages for use in biotechnology. Potential commercial benefits from microorganisms and their enzymes give great opportunities for use. The microorganisms from cold environment possess enzyme systems that produce biologically active substances at lower temperature, which are of particular importance for biotechnology. The geographical location of the Far East of Russia, unique geological features provide rich sources of microbial diversity of unique types of psychophilic microbes and cold-active enzymes.

We investigated the marginal seas and soils of the cold regions of Russia. Seven isolates from sea water and 5 isolates from soils with psychophilic properties and interesting cold-active enzymes were isolated. Microorganisms present in unique ecological niches, including in areas with constantly low temperatures, are rich sources of cold-active enzymes. The main commercial benefits derived from these microorganisms and their products give us great opportunities for future use. Scientists suggest different methods for studying the activity of enzymes of microorganisms, but they all combine the culture of microorganisms with selective media. The screening of these strains were performed by designed plates with enzyme substrates and corresponding dyes. The halo ratio of the hydrolysis zones was measured for evaluation. The *Pseudomonas japonica* strain isolated from seawater from the marginal seas of Russia has the ability to produce enzymes to destroy cellulose, xylan, amylose and pectin, and logos activity during cultivation at 10 °C. The cold-active enzymes from *P. japonica* will be further identified by proteomic approach followed by gene cloning and characterization.

The work was supported by the Presidium of the Far Eastern Branch of the Russian Academy of Sciences and the Ministry of Sciences and Technology, Taiwan.

ID: CMVI2018_10004

Title: Pyruvate cycle increases aminoglycoside efficacy and provides respiratory energy in bacteria

Name: Yubin Su

Affiliation: Sun Yat-sen University

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Abstract:

The emergence and ongoing spread of multidrug-resistant bacteria puts humans and other species at risk for potentially lethal infections. Thus, novel antibiotics or alternative approaches are needed to target drug-resistant bacteria, and metabolic modulation has been documented to improve antibiotic efficacy, but the relevant metabolic mechanisms require more

studies. Here, we show that glutamate potentiates aminoglycoside antibiotics, resulting in improved elimination of antibiotic-resistant pathogens. When exploring the metabolic flux of glutamate, it was found that the enzymes that link the phosphoenolpyruvate (PEP)-pyruvate-AcCoA pathway to the TCA cycle were key players in this increased efficacy. Together, the PEPpyruvate-AcCoA pathway and TCA cycle can be considered the pyruvate cycle (P cycle). Our results show that inhibition or gene depletion of the enzymes in the P cycle shut down the TCA cycle even in the presence of excess carbon sources, and that the P cycle operates routinely as a general mechanism for energy production and regulation in *Escherichia coli* and *Edwardsiella tarda*. These findings address metabolic mechanisms of metabolite-induced potentiation and fundamental questions about bacterial biochemistry and energy metabolism.

ID: CMVI2018_10005

Title: IFN- α Enhances Adenoviral Vector FMDV Vaccine Immune Response by promoting Memory Tfh Cells

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Abstract:

Background: T follicular helper (Tfh) cells are the subset of CD4+T helper cells that are required for generation and maintenance of germinal center (GC) reactions as well as the generation of long-lived humoral immunity. It is important for vaccine immune response. Our previous studies have confirmed that IFN- α can enhance the differentiation and proliferation of Tfh cells induced by foot-and-mouth recombinant adenovirus vaccine, assist B cell differentiation and proliferation, promote the formation of germinal center, and play an important role in humoral immunity. The key to the vaccine immune response is the production of memory cells. In this study, we investigated the effect of IFN- α on the regulation of memory Tfh cells in Adenoviral Vector FMDV Subunit

vaccine.

Method: 6-8 weeks BALB/c mice were randomly divided into 6 groups. Each group was intraperitoneally injected with rAd, rAd5VP1, rAd5poIFN- α , rAd5VP1+rAd5poIFN- α , rAd5VP1-2A-PoIFN- α , inactivated vaccine respectively. After d30, d60 and d90, the mice were sacrificed and lymphocytes were stained with flow cytometry to detect the frequency of memory Tfh cells (CD4+CXCR5+CD44+CD62L-/+) and memory B cells(B220+GL-7-IgG1+).

Results: We found that IFN- α can significantly increased the frequency of memory Tfh cells and memory B cells in recombinant adenovirus vaccines on day 30, 45, 90. And the effect is more obvious than the common foot-and-mouth disease inactivated vaccine.

Conclusion: Overall, our study have shown that IFN- α may enhance vaccine immune responses by promoting the production of memory Tfh cells. This provides a broader perspective for the development of new vaccines.

ID: CMVI2018_10006

Title: The effect of TLR7 agonist Imiquimod on Tfh cell differentiation in MRL/lpr Mice

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Abstract:

Background: The recognition of microbial patterns by Toll-like receptors (TLRs) is critical for activation of the innate immune system. While recent study showed TLR7 could induces CD4+ T anergy, TLR7 ligands may be used as a means of inducing "tolerance" on CD4+ T cells in human autoimmune diseases. Follicular helper T cells (Tfh cells), a group of novel CD4+ T cell subsets, which can mediate humoral immune responses and augment autoimmunity, whereas the role of TLR7 on Tfh cells in autoimmunity diseases is not clear. Here, we aimed to investigate the effect of TLR7 agonist Imiquimod on Tfh cell differentiation in MRL/lpr Mice.

Method: In vitro and in vivo, the effects of different concentration of TLR7 agonist Imiquimod on the differentiation of Tfh cells in BALB/c mice were examined. Furthermore, we observed the therapeutic effects of TLR7 agonist Imiquimod in 16-week-old female MRL/lpr mice; MRL/lpr mice received intraperitoneal injections every day for 4 weeks, normal saline and Dexamethasone as control. And we examined the population of Tfh cells and IgG1 plasm cells as well as renal lesion severity in MRL/lpr mice.

Results: In vitro and in vivo, we found that TLR7 agonist reduce proliferation of Tfh cells compared with control group. The result showed the renal lesion severity of 16-week-old MRL/lpr mice was significantly ameliorated and the Tfh cells population and IgG1 plasm cells was decreased after treated with Imiquimod for 4 weeks compared with normal saline groups.

Conclusion: Taken together, the results of this study demonstrated that the TLR7 agonist Imiquimod could ameliorated renal lesion severity and decreased the Tfh cells population and IgG1 plasm cells in lupus-prone female MRL/lpr mice, and maybe a target of treatment SLE.

ID: CMVI2018_10001

Title: Identification of Host Factors in Dengue Virus-Human Protein-protein Interactions

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Abstract:

Dengue fever is an important mosquito-borne disease in tropical regions, caused by dengue virus (DENV). Infection with the virus in humans involves a complex interplay of virus and host factors which leads to progression of the disease. Understanding these host factors is thus of critical importance to develop new drug targets and future disease control strategies against DENV. In this study, we used a high-throughput yeast two-hybrid (Y2H) screen to identify human factors

interacting with DENV. Non-structural proteins of DENV were used as baits to test for interaction with the Mammalian Gene Collection human prey library. Upon successive interaction between the baits and preys, the yeast clones were sequenced targeting the human prey genes to identify the DENV interacting partners. From the Y2H screen, we identified 94 potential human interactors, which include immune signalling regulators, potassium voltage-gated channels, transcriptional regulators, protein transporters and endoplasmic reticulum-associated proteins. Interactions of 15 proteins of particular interest were further tested using a luminescence-based pull-down assay and 13 were positive. Experiments in verifying the biological significance of these proteins (using co-immunoprecipitation, immune signaling and RNAi knockdown experiments) are ongoing in order to investigate their importance during DENV replication.

ID: CMVI2018_10007

Title: Aspirin inhibit cell proliferation and induce its apoptosis via Tigit/Bcl-2/Bax in colon cancer cell

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Abstract:

Background/Aims: Colorectal cancer (CRC) is one of the most common malignant cancers, which still keep the very high incidence and mortality all over the world. Aspirin (ASA) is a nonsteroidal anti-inflammatory drug which showed the promising prevention capacity to the chronic diseases including cancers in recently scientific research. In our previous studies, aspirin has showed the consequence to reduce the incidence of colorectal cancer. Immune checkpoint blockade of TIGIT alone or combined with other immune checkpoint blockade has gained impressive results on Melanoma treatment. However, what is the relationship between Aspirin and TIGIT to prevent colorectal cancer incidence has nothing to know so far.

Methods: CCK8 assay was employed to detect the

colorectal cancer cell viability by Aspirin treatment. Flow cytometric assay was used to detect the colorectal cancer cells apoptosis. Western blotting was performed to detect the expression of the apoptotic related proteins. ANOVA test was used for the statistical comparisons.

Results: Aspirin can inhibit colorectal cancer cell viability and promote colorectal cancer cell apoptosis. Consistently, aspirin can increase anti-apoptotic protein Bax's expression. Suppression of TIGIT can influence the effect of aspirin on cell proliferation. Moreover, we found that the expression of Tigit decreased after increasing the concentration of the aspirin treatment.

Conclusion: We have provided new evidence that aspirin attenuates colorectal cancer cells proliferation and induces the colorectal cancer cells apoptosis through downregulation of TIGIT, which providing new evidences for aspirin application in clinics.

ID: CMVI2018_10008

Title: Investigation of Streptococcus pyogenes carriage in population vulnerable to scarlet fever during 2015-2017 in Shanghai, China

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Abstract:

This study aimed to investigate the carriage of Streptococcus pyogenes in population vulnerable to scarlet fever and to compare their genotypic characterization between different age groups. Pharyngeal swabs were collected from 120-150 students in each of the three districts in Shanghai in May and December during 2015 to 2017, while emm typing and detection of 12 superantigen genes were performed to characterize the isolates. During 2015-2017, the average carriage rate in students was 5.7% (135/2,371), without significant difference between different years or districts. The carriage rate was significantly different between children from the

three age groups, with 2.4% in 3-4 years, 5.4% in 5-9 years, and 9.1% in 10-14 years. Eight emm types were found, including emm1, emm4, emm12, emm22, emm75, emm89, emm70 and emm241, among which emm12 accounted for 60%, and emm1 27.5%. The predominance of emm12 was found in each year, but the proportion of emm12 was lower in 10-14 years (43.3%) than in 3-4 years (86.7%) and in 5-9 years (73.3%) (P=0.002 and 0.003). Superantigen genes of speB, speC, speG, ssa and smeZ were found in almost all the isolates. The average carriage of S. pyogenes in population vulnerable to scarlet fever was 5.7% in Shanghai, highest in 10-14 years (9.1%), while emm12 was the predominant type.

Keywords: Scarlet fever, Carriage rate, Child, emm type, Superantigen

ID: CVM2018_10005

Title: Early Warning System of Risk in Dairy Cows with Inactive Ovaries

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Abstract:

The incidence of Inactive ovaries of dairy cows in China is relatively high. There is no complete early warning system for the occurrence of ovarian quiescence in clinical cows. This test provides early warning indicators for clinical prediction of ovary cessation in dairy cows. This experiment selected blood samples of dairy cows from 60 to 90 days postpartum in the inactive ovaries group and control group. Differential proteins were selected on the basis of proteomics, three energy indexes: AST, Glu, NEFA. Four reproductive hormones: E2, P4, FSH, LH, and four differentially expressed proteins: IGFBP-2, AHSG, APO-A4, and RBP-4. Key enzyme activities: ALDOB, LDHB, ITIH3, GPX3, SPAM1, PKM2. The ELISA test kit was used to detect the content and activity of the above markers in the test bovine serum. Through correlation analysis, binary logistic regression modeling and ROC analysis, a single indicator early

warning technique for APOA4 and ITIH3 was established. The early warning values were APOA4 > 28.825 µg/L and ITIH3 > 195.07 ng/L. A multi-index early warning system based on potential biomarkers of APOA4+ITIH3 and APOA4+ITIH3+E2 was established. The former had an early warning value of: APOA4 > 19.55 µg/L; ITIH3 > 191.14 ng/L; the latter has an early warning value: APOA4 > 47.56 µg/L, ITIH4 > 187.80 ng/L, E2 < 69.63 ng/L.

ID: CVM2018_10007

Title: Sero-Prevalence of Toxoplasmosis (Toxoplasma gondii) in Small Ruminant Population of District Sahiwal, Punjab, Pakistan

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Abstract:

Toxoplasmosis, caused by *Toxoplasma (T.) gondii* (Apicomplexa: Sporozoa: Sarcocystidae), is a globally distributed parasitic zoonosis and anthroponosis. Small ruminants are playing critical role in transmission of *Toxoplasma* by harbouring its infective stages. This study reports the sero-prevalence of targeted sheep and goat population of Sahiwal district, Punjab, Pakistan by using Latex Agglutination Test (LAT). To this end, blood samples (n=150) were collected from randomly selected sheep and goat for collection of sera. Additional information, including host's sex, age and other related parameters was recorded on a predesigned questionnaire. Collected serum samples were screened through commercially available LAT kit for *T. gondii*. Chi-square test was performed on collected data to find out association between intrinsic and extrinsic factors associated with sero-prevalence of *T. gondii*. Overall, significantly higher ($P < 0.05$) prevalence of *T. gondii* was recorded in goats (25.11%) as compared to sheep (13.13%). In case of intrinsic factors associated with toxoplasmosis in study animals, young and female animals were found more prone to infection than adult and male animal, but results were not statistically significant ($P > 0.05$). In case of breeds of

animals, Beetal goats were more infected ($P < 0.05$) with *T. gondii* followed by Teddy goats, Kajli sheep and Lohi sheep in descending order of abundance. Among extrinsic factors associated with prevalence of toxoplasmosis in study animals, free ranged, open and grazing animals showed higher prevalence as compared to farmed, rope tied and stall feed animals, respectively but no statistical association is seen ($P > 0.05$). The results of the present study provided a foundation for planning for control strategies in target animal species which indirectly may also reduce the *Toxoplasma* infection in other domestic animals.

ID: CVM2018_10009

Title: Prevalence of Anaplasmosis among Dairy Cattle and the Challenges for its Control in Bahrain

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Abstract:

Title: Prevalence of Anaplasmosis among Dairy Cattle and the Challenges for its Control in Bahrain.

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Background: This study was conducted to determine the prevalence and economic importance of Anaplasmosis among cattle herds in some Bahrain dairy farms. Anaplasmosis is one of the most serious bovine health hazards that creates serious economic loss and clinical implications among cattle in Bahrain. The incidence, reduction of production, losses and accurate prevalence rates and preventive tools of Anaplasmosis in Bahrain cattle herds was not well recognized due to the shortage of research and lackage of field surveys.

Material and Methods: One year (2017) study was done on the actual prevalence rates of Anaplasmosis

among local dairy cattle in Bahrain depending mainly on the blood and ticks samples submitted routinely to the public veterinary clinics and diagnostic laboratory. A total of 63 fresh blood samples and 3 tick samples were received at the verinary diagnostic laboratory for the purpose of blood parasites clearence testing. All blood samples were examined by Wright-Giemsa stain for detection of blood protozoan parasites. Six (6) samples were detected positive with Anaplasma species.

Results: The overall prevalence rate % of Anaplasmosis among dairy cattle in Bahrain farms was estimated as 9.5%. A total of 63 fresh blood smear samples were tested where 6 samples detected positive with Anaplasmosis. Four (4) positive samples were female and 2 were males from an overall of 51 females and 12 males examined during the study period.

Discussions and Conclusion: Neither animal age or sex showed a signicance in the prevalence rates and severity of Anaplasmosis among dairy cattle in Bahrain farms where it was mostly seen with much similarity regarding to the variation in the total numbers both

sexes and variable ages exaxmined.

Biography Abdalla Fadlalla Azrug has completed his PhD in Veterinary Helminthology Department at Ankara University, Turkey in 2011. He worked as the director for two regional veterinary research and diagnostic laboratories, Fashir and Nyala Regional Veterinary Research laboratories in Sudan from 1999-2012. Recently he is the Head of the Central Veterinary laboratories at Agriculture and Marine Resources Affairs, Manama, Bahrain. He has published more than 15 papers in reputed journals and scientific international conference books participating in many international conferences related to the field of veterinary science and one health. Also he acted in the position of OIE delegate for Kingdom of Bahrain from 2014 -2017.

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Physics Sciences: Technical Session

ID: LOC2018_10000

Title: Compressing Electron Pulse with Alternating Electric Field

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Abstract:

A novel technique of symmetric type quasi-linear electron pulse duration modulation is proposed. The salient feature from the conventional photoelectron gun is the introduction of the alternating electric field resonator. The electric field that results is synchronously controlled to generate the desired quasi-linear differential energy modulation on the electron pulse passing through. The effect resulted

directly is that the leading electrons undergo negative energy modulation and decelerate, while the rear ones positive energy modulation and accelerate, which eventually leads to electron-pulse-duration modulation. The technical details are demonstrated.

ID: LOC2018_10005

Title: Optical system design of telescope based on mixed modulation diffractive lens

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Abstract:

Using of diffractive optical elements (DOE) in the

Schupmann system offer a new way for the construction of ultra-large aperture telescope. The Fresnel Corrector, one of the DOEs, is the key device in the Schupmann system, which is used to correct the chromatic aberration introduced by the diffractive primary lens called Magnifying Glass. Generally, in a large aperture telescope (>20m), the Fresnel Corrector is a diffractive lens with a large aperture and a small F number, so that it is difficult to process. In this article, an improved device with a small F number but a large rim feature size, called amplitude and phase hybrid modulation Fresnel diffractive optical element (APHMFDOE), is used here as the Fresnel corrector. First, APHMFDOE with appropriate parameters is designed to match the dispersion of the Magnifying Glass so that the system meets the achromatic condition. Second, the optical characteristics of this improved system are simulated and compared with those of the general system based on the conventional Fresnel corrector. Our approach introduces a new dispersion correction device, which not only can eliminate the chromatic aberration caused by Magnifying Glass, but also can reduce the processing difficulty of Fresnel Corrector.

ID: LOC2018_10100

Title: Principle and application of spatial-spectral interference in ultra-short laser facilities

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Abstract:

Spatial-spectral interference carries the spectral phase difference information between short pulses. An unknown short pulse can be characterized via spatial-spectral interference with a reference short pulse. In this report, the principle of spatial-spectral interference is introduced, and the application in ultra-short pulse facilities is given.

(I) The pulse compressor is one of the key in an ultra-short laser facility. An alignment method of a pulse compressor based on spatial-spectral interference

is proposed. This method has been successfully applied to a pure petawatt-class OPCPA system named CAEP-10PW in China Academy of Engineering Physics (CAEP), and a Fourier-transform-limited pulse width of 19.6fs is achieved.

(II) The grating tiling technology is one of the most effective means to increase the aperture of the grating. The line-density error (LDE) between sub-gratings will degrade the performance of the tiled grating. We propose a compensation method and demonstrate it based on spatial-spectral interference.

Key words: Spatial-spectral interference, Spectral phase, Ultra-short pulse

ID: LOC2018_10010

Title: Study on the Coupling Efficiency of Large Mode Area Double-clad Photonic Crystal Fiber Based on Zemax and Trace Pro Software

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Abstract:

Photonic crystal fiber(PCF) amplifier technology is currently emerging as a highly practical platform for high power ultrafast laser(fs, ps, ns) applications due to superior compactness, diffraction limited mode quality, high peak power damage threshold and high conversion efficiency. In this paper, we study the coupling efficiency of large mode field area double-clad PCF using Zemax and TracePro software. Firstly, the collimating lens and focusing lens were preliminary proposed on the basis of fiber structures and collimation equation. Then the coupling efficiency of seed signal port was studied using the Zemax software based on physical optics propagation method. This includes the collimating performance of single-mode, polarizing double-clad ytterbium fiber(DC-200/40-PZ-Yb fiber) with a mode area of more than 700 μm^2 and the seed coupling efficiency that between the focusing lens and the crystal ROD fiber(aeroGAIN-ROD-PM85 fiber) with a 3300 μm^2 mode field area. Numerical simulation

results show that the coupling efficiency of the seed signal port could be above 84% along with the lens parameters is optimized. Furthermore, the pump coupling efficiency that from the pump source(a standard 105/125 μ m multimode fiber) to the crystal ROD fiber was studied using the TracePro software based on ray-tracing method. And then we achieved a high coupling efficiency on the pump port which is about 82%. As a consequence, the coupling efficiency of the seed signal port and pump port satisfy the actual demand. This work constitutes a solid basis for the technological parameters selections of high peak power PCF amplifier. The combination of robust single-mode guidance, excellent PER, high coupling efficiency and a large mode area, has made the PCF amplifier technology the preferred choice for many ultrafast laser systems(fs, ps, and ns system).

Keywords

Photonic crystal fiber, photonic crystal fiber amplifier, coupling efficiency, lens selection

ID: LOC2018_10009

Title: Beam and target alignment at the ICF laser device using a new grid target

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Abstract:

The requirements for beam and target alignment for successful ignition experiments on the ICF laser device are stringent: the average of beams to the target must be within 30 μ m. When the RMS offset between the beam center and the pre selected target center exceeds 13.6 μ rad, there will be a bad effect on the uniformity of the radiation field, and then the experimental accuracy will be reduced too. In order to accurately evaluate the shooting accuracy of the laser device, it is necessary to test the shooting accuracy. And we can correct the offset between beam and target to meet the requirements. At present, most of the target precision testing, measuring the distribution of X-ray generated by tripling laser ablating the target instead of the location information of

tripling laser reaching the target, is achieved by calculating the error between impact points and aiming points. But the fundamental and second harmonic laser will reach the target at the same time with tripling laser, and produce spurious X-ray. In this paper, we analyzed the characteristics of X-ray generated by the different beams ablating the target and studied the effects of stray light on the shooting accuracy. On this basis, a new grid target has been designed. Using this grid target we can simultaneously test the shooting accuracy of many beams. This ensures the consistency of the experiment and improves the efficiency and accuracy of the shooting accuracy test.

ID: LOC2018_10007

Title: A study on the control method of complex vector optical field with near-field conformal

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Abstract:

Phase and polarization singularities of light fields have unique properties and application value. Researches on the vector vortex field control technology provides a new theory and methods for revealing the new physical mechanisms and effects in communications and light-particle interactions. Based on the previous research, this paper proposes a vector vortex optical field control method with the near field intensity distribution of light beam conformal and the polarization and phase distribution inhomogeneous. Theoretical analysis indicates that the periodical polarization structures and phase singularities can be formed without changing the intensity distributions of the input beam. And the period of the structure is dependent on the length of crystal and the focal length. It is in direct proportion to the focal length and in inverse proportion to the length of crystal. The states of polarization and phase distributions of outputs are studied theoretically and experimentally in detail for different polarized inputs. It is shown that the

polarization of the input beam can be used to control the polarization and phase structures of the output beam. The periodical polarization structures can be constructed into arbitrary homogeneously polarized beams without changing the intensity distributions. In this method we also propose the cascade biaxial crystals transformation model, with more freedoms to control the light field's intensity, polarization and phase distribution. This method is expected to extend new coding freedom for optical communication, to introduce polarization parameters for laser processing, and to increase the diversity of light and matter interactions for ICF research.

ID: LOC2018_10008

Title: Low-spatial coherence high-power electrically injected 6xx nm dual-emitter laser

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Abstract:

Laser-based displays have attracted much attention owing to large-size screen and full-color gamut compared with other displays such as liquid crystal display and light emitting diode. However, there exists a phenomenon, speckle, limits the applications of laser display because of the high coherence of laser. In this work, we developed an electrically injected 6xx nm dual-emitter laser which combines the low-spatial coherence with the high-power. The output power of the dual-emitter laser exceeds 500 mW under 20 °C pulse operation. The single emitter consists of D-shaped section used to obtain more independent spatial modes thus reduces coherence and a stripe area to obtain the high power. The radius of the D-shaped cavity is 500 μm and the length of stripe is 1000 μm. We used the standard photolithography and inductively coupled plasma (ICP) process to fabricate the device. The speckle contrast was measured to be 5%. It exhibits a great potential of reducing speckle from the source directly for laser display.

ID: LOC2018_20000

Title: Control of femtosecond filamentation in fused silica using pulse-shaping technology

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Abstract:

The control of the filamentation in fused silica is realized by using shaped femtosecond laser pulse which is based on computer-controlled liquid crystal spatial light modulator. It is shown that the filament can be formed at a designated position in fused silica by using the pulse shaping technique. Furthermore, a long-distance controllable displacement of the onset of filamentation is achieved, with a maximum displacement of 5.4 mm. On the other hand, the intensity of filamentation can be enhanced gradually by using the method. Correspondingly, the numerical simulation based on the 3D+1 nonlinear Schrödinger equation is used to study the filamentation of shaped pulses in fused silica. The simulation results are consistent with those of experiments. The onset and intensity of filamentation are found to be dependent on the peak intensity and envelope distribution of shaped femtosecond pulse. This method provides a simple way to optimize the procedure of fabricating waveguides, optical switches, Micro-nano structures, and so on.

ID: LOC2018_20001

Title: Clarification of the role of leading and tailing pulse edges in filamentation and supercontinuum generation in transparent media

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Abstract:

Filamentation of femtosecond laser pulses with flat-top

and different steep leading and tailing edges in air and fused silica has been simulated. The roles of the pulse edges in supercontinuum generation are clarified. It is found that under a relative lower laser power, the spectral broadening of the laser pulse in air originates mainly from the self-phase modulation of both pulse edges, and the leading edge and tailing edge contribute to the red-side and blue-side extension respectively. While under a relative higher power condition, the leading edge of the pulse plays a dominant role in the blue-side extension of the supercontinuum due to electron generation. For the spectral broadening of laser pulse with higher power in fused silica, the initial steep leading edge contributes to the enhancement of the red-side extension. The blue-side extension cannot be enhanced by using steeper leading edge because it is mainly contributed by the self-steepening effect. This study distinguishes the contributions of pulse edges to the supercontinuum generation, based on which one can manipulate pulse shapes to obtain desired supercontinuum.

ID: CAVNC_D2018_10002

Title: Performance of Floor Impact Sound Insulation Layer Composed of Scrambled TPU and EVA

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Abstract:

Most apartments in Korea have a wall-type structure that presents poor performance regarding floor impact sound insulation. To minimize the transmission of floor impact sound, flooring structures are used in which an insulating material, a 30-mm-thickness pad of expanded polystyrene(EPS) or ethylene vinyl acetate(EVA), is sandwiched between a concrete slab and the finished mortar. Generally, a single-material pad used for insulation has a heavyweight impact sound level of 44-47 dB with a 210-mm-thickness slab. This study provides an analysis of the floor impact sound insulation performance using thermoplastic

polyurethane(TPU), EVA, and EPS materials with buffering performance. Following mock-up tests, the effect of lightweight impact sound turned out to be similar, but heavyweight impact sound was decreased by approximately 3 dB compared with a conventional single-material insulation pad.

ID: CAVNC 2018

Title: Physical and Numerical Modeling of Pressure Pulsations in the Guide Diffuser and Volute of a Screw-Centrifugal Pump

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Abstract:

The important issue in development of high speed screw-centrifugal pumps is reliability and lifetime linked with reduction of pressure pulsations and hydrodynamic vibration of the pump casing. The computational and physical modeling of pressure pulsation phenomena bases on its dual nature. At the outlet of the centrifugal impeller acoustic oscillations appear that are propagated at the speed of sound in the operating fluid. At the same time, there are vortex disturbances that are convected by the main flow. Vortex perturbations of the main flow parameters are called "pseudosound" or the vortex mode. The modeling of generation and propagation of pressure pulsation in screw-centrifugal pumps has been carried out using the acoustic-vortex decomposition of the compressible fluid pressure field.

For the first approximation one can neglect convective terms in the time derivative (1):

$$\frac{1}{a^2} \frac{\partial^2 i}{\partial t^2} - \Delta i = S$$

where the source function determined from the field of velocities of incompressible flow is denoted by S :

$$S = \nabla(\nabla(\frac{1}{2}U^2) - \mathbf{U} \times (\nabla \times \mathbf{U}))$$

Now let us proceed to dimensionless variables. As a spatial scale and characteristic velocity, we take outlet radius R_2 and circumferential velocity u_2 on the external diameter of the centrifugal impeller. Then dimensionless values will be written down as follows:

$$\tilde{\mathbf{x}} = \frac{\mathbf{x}}{R_2}; \quad \tilde{\mathbf{U}} = \frac{\mathbf{U}}{u_2}; \quad \tilde{t} = \frac{t}{\frac{(2\pi R_2)}{(z_1 u_2)}} = t f_{b1}; \quad \tilde{i} = \frac{i}{u_2^2} \quad (3)$$

Using these relations, one obtains the equation in nondimensional form

$$\Lambda^2 \frac{\partial^2 \tilde{i}}{\partial \tilde{t}^2} - \tilde{\Delta} \tilde{i} = \tilde{S}$$

where Λ is the dimensionless similarity criterion of the given problem.

It is simple to show that the parameter Λ is the product of Mach number and Strouhal number and represents relation of the impeller tip radius R_2 to the main BPF wavelength λ .

$$\Lambda = \frac{u_2 z_1}{2\pi a} = \frac{f_{b1} R_2}{a} = \frac{u_2}{a} \frac{f_{b1} R_2}{u_2} = M \cdot St = \frac{R_2}{\lambda}$$

Where f_{b1} – main blade passing frequency, z_1 – number of blades, a – speed of sound. This is the ratio of the circumferential speed of the centrifugal impeller on the outer diameter to the speed of sound multiplied by a factor proportional to the number of blades. The circumferential velocity determines the velocity of propagation of pseudo-sound perturbations, and the speed of sound relates to acoustic waves. Based on the last relationship, one can construct a method of physical modeling of pressure pulsations in a centrifugal pump using a pump air model.

Keywords

Pressure Pulsations, Centrifugal Pump, BPF Component, Decomposition, Pump Air Model

ID: CAVNC_D2018_10004

Title: Crack localization using transmissibility of operational deflection shape and its application in cantilever beam

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Abstract:

Due to the nonlinearity of breathing crack, cracked structure under excitation of a single frequency always generates higher harmonic components. In this paper, operational deflection shape (ODS) at excitation frequency and its higher harmonic components are used to map the deflection pattern of cracked structure. While ODS is sensitive to local variation of structure in nature, a new concept named transmissibility of operational deflection shape (TODS) has been defined for crack localization using beam-like structure. The transmissibility indicates the energy transfer from basic frequency to higher frequency. Then, Teager energy operator (TEO) is employed as a singularity detector to reveal and characterize the features of TODS. Numerical and experimental analysis in cantilever beam show that TODS has strong sensitivity to crack and can locate the crack correctly.

ID: RERP2018_10000

Title: Damage cross-section for neutron-irradiated 15-15Ti steel

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Abstract:

Irradiation is one of the limiting factors for all reactor materials alongside a high temperature, a pressure, and a chemical interaction. The most profound effects of irradiation of materials occur in the core of nuclear reactors, where more aggressive environments, higher temperature and a greater level of irradiation. For China Initiative Accelerator Driven System (CIADS), the 15-15Ti steel has been chosen as a cladding material

due to its properties. Although the steel was the structural materials of the fuel subassemblies of Phenix and Superphenix reactors, there is a lack of available information on its behavior under irradiation.

It is known that there is a correlation between metal properties and the amount of DPA (displacements per atom) appeared in the metal under irradiation. Therefore, we chose the calculation of displacement cross-section as a starting point for an estimation of property changes produced. The well-known NJOY code in conjunction with IOTA code was used to evaluate the displacement cross-sections for 15-15Ti steel irradiated with neutron energies from 10-10 MeV to 20 MeV. These displacement cross-sections were used to estimate radiation damage under different irradiation conditions.

ID: RERP2018_10003

Title: Environmental Radiation Measurement and Assessment

Name: Chariette Ereh Nandi-Esom

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Abstract:

Because of the constant exposure of Human beings to radiation caused by terrestrial, extra-terrestrial and anthropogenic radio nuclides, it is necessary to determine and estimate the activity of various radio nuclides in environmental media such as vegetation, soil, and water. In the present research, the activities of 226Ra, 232Th and 40K are measured in soil, vegetation and water samples, collected from Yangdong District, Yangxi County, and Jiangcheng District of Guangdong Province, China using a HPGe based gamma spectrometry system. The measured mean activity of

226Ra, 232Th and 40K in soil samples was found to be 31.19 ± 1.2 , 47.00 ± 2.30 and 589.31 ± 17.52 Bqkg-1, respectively. The measured mean activity of these radionuclides in all water samples was found to be below minimum detectable activity. The measured mean activity of 226Ra, 232Th and 40K in vegetation samples was 19.92 ± 3.09 , 25.36 ± 8.11 and 4982.94 ± 85.68 Bqkg-1, respectively. No anthropogenic 137Cs was detected in these environmental samples. Mean radium equivalent activity (Raeq), external radiation hazard index (Hex), internal radiation hazard index (Hin) and absorbed dose rate (D) for the area under study were determined as 142.92 Bqkg-1, 0.38, 0.47 and 66.47 nGyh-1, respectively. The annual effective dose equivalent (AEDE) varied in the range from 0.03 to 0.12 mSv y-1. It is concluded that the surveyed area do not pose any significant radiological risk to the population and environment.

ID: MANPP2018_10100

Title: Multiple ionization cross sections of Ne and CO induced by very high-q fast projectiles ($q/v > 1$)

Name: Haoxing Zhou

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Abstract:

In this paper, we extend our previous work of classical over barrier ionization (COBI) model to study the multiple ionization cross section of Ne and CO molecule collided by very high-q fast projectiles ($q/v > 1$). The model gives similar results to the independent-electron-approximation calculation and is in good agreement with experimental data. The very small computational time required make it a good candidate for studying the multiple ionization of complex molecules under high linear energy transfers.

Part V 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: 10-15 Minutes of Oral Presentation
- Invited Speech: 40-45 Minutes of Invited Speech

Part VI Hotel Information

About Hotel

International Asia-Pacific Convention Center Sanya is a five star standard luxury hotel, which locates beside the seashore, and is the ideal place for vacation and conference. The hotel has 254 luxury and comfortable rooms, and 16 conference rooms in different sizes. The conference rooms can accommodate people from 20-1000 and totally square 5400m². Housing, dining, recreation facilities... everything needed is ready, Even National initiative seawater swimming pool, sea recreational centre and so on, which make you a pleasant vacation. High-speed net connectors are equipped in the houses and service of renting laptops is provided, all these give you a convenient office atmosphere while you are on vacation.

Address: No.17, Haipo tourism and economic zone, Sanya Bay, Sanya city, China

三亚市三亚湾海坡旅游经济开发区17横路

URL: www.iapccsanya.com

Tel: (86 898) 88332666

Fax: (86 898) 88332266

How to Get to the Hotel

Downtown of Sanya: 30 minutes ride

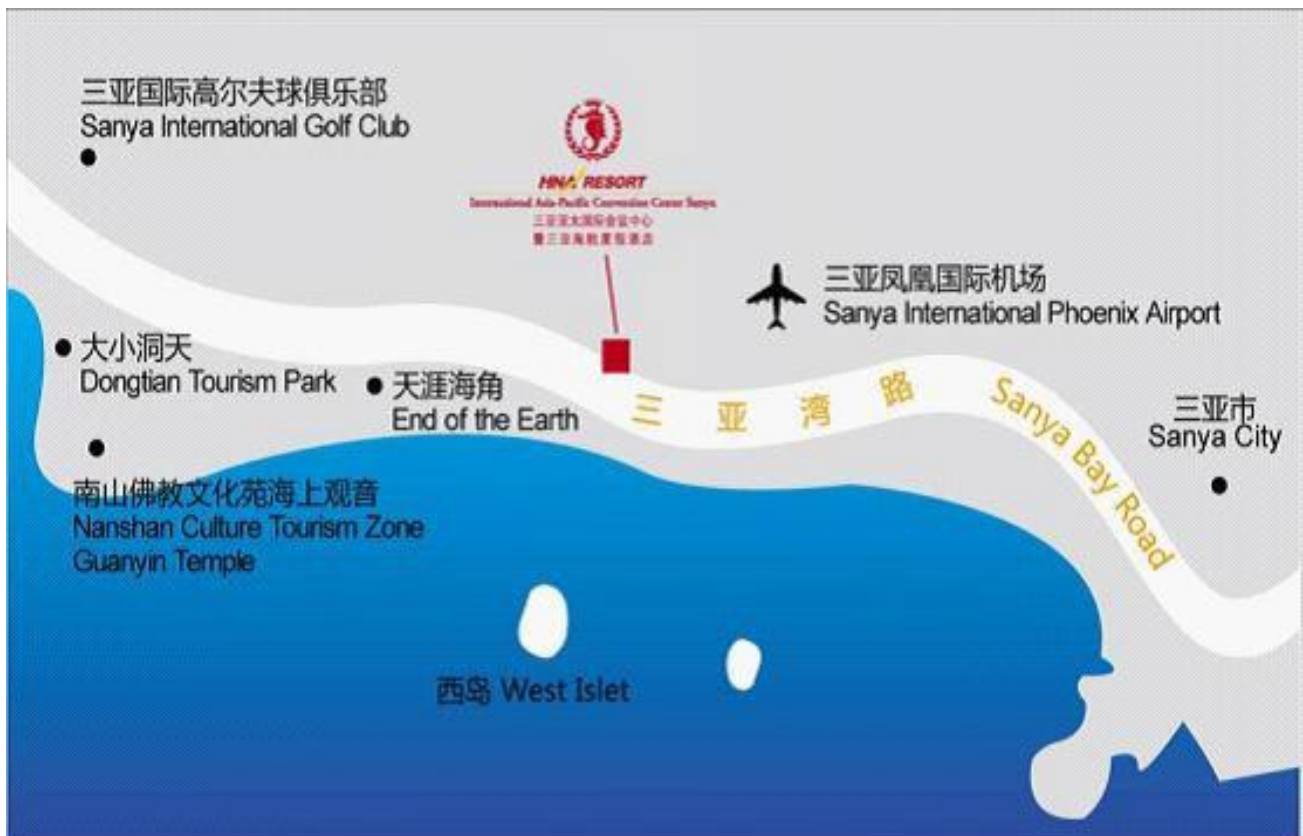
Sanya Phoenix Airport: 15 minutes ride

Sanya International Golf Club: 20 minutes ride

End of the Earth: 10 minutes ride

For non-Chinese author, please show the following info to the driver if you take a taxi:

请送我到： 三亚市三亚湾海坡旅游经济开发区17横路
亚太国际会议中心暨三亚海航度假酒店



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