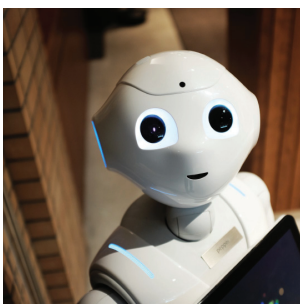
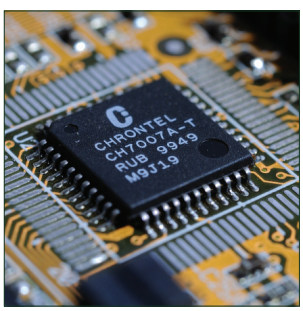
allied academies

e-Poster

Physics & Laser Tech 2019



International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Study of electromagnetic spectrum of nano-sized viral particles via simulation

Tamar Bzhalava[1], Mzia Tsirekidze[1] and **Levan Goderdzishvili[2]**

[1]Georgian Technical University, Georgia

[2]Free University, Georgia

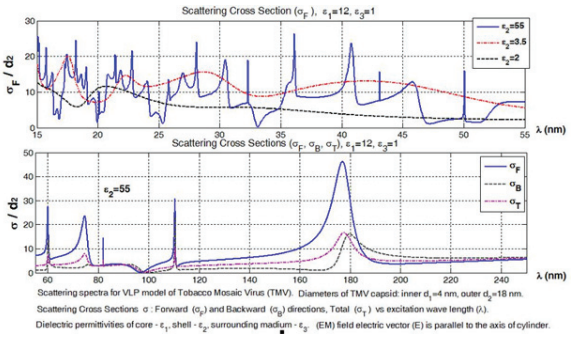
Study of spectral characteristics of nano-sized viral particles, virions the extracellular infective forms of viruses is proposed. Morphology of virions is icosahedral, prolate or helical, size of that varies from 20 to 300 nm. Based on structure analysis of virions, consisting of inner core of nucleic-acids (RNA or DNA) and outer protective protein coat (capsid), the core-shell model of virus-like particle (VLP) is considered for simulation.

The single-particle study of electromagnetic (EM) wave & VLP interaction is based on Maxwell EM theory, separation of variables method for solving Helmholtz equation. Theoretical solution of electrodynamics boundary problem is applied for determination of EM fields in the areas of core, shell and surrounding medium of nano-sized particles. EM fields are presented as the sum of multipole wave-modes, number of that depends on "electrical" size of particles and is defined empirically within prescribed accuracy. Expected spectral "response" is observable on far-field characterizations and strongly depends on core-shell related electric and geometric parameters of VLP, especially in resonance wavelength range.

Computer simulation (based on MatLabR2013b) is used for studying EM field characteristics vs excitation wave length, for appreciation of possible resonant wave range correlating with scattering efficiency of VLP. VLP "spectrum" is demonstrated for cylindrical nanoparticle, namely un-enveloped rod-like virion of Tobacco Mosaic Virus (TMV), deciding 2D boundary problem.

Proposed methodology for modelling of EM spectra of virions seems to be a simpler way in determining the spectral response of whole viral particle, which in complement with experimental spectroscopic studies could solve the problem of defining the unique and specific "fingerprints" important in nano-bio-particles characterization. Findings are applicable in nano-bioparticles detection and identification systems, aerosol spectroscopic studies as well.

The work was carrying out in GTU supported by Shota Rustaveli National Science Foundation (SRNSF) under Grant Agreement (FR/430/3-250/13).



Speaker Biography

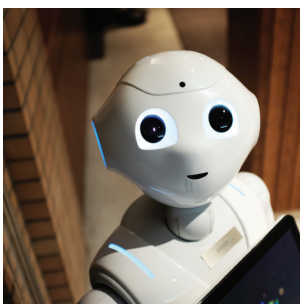
Tamar Bzhalava is an associate professor at the Department of Engineering Physics, Georgian Technical University (GTU). She was the candidate (PhD) of Physics and Mathematics Sciences (1990). She was the scientific manager (2014-2017) of grant project of Shota Rustaveli National Science Foundation (SRNSF) - "Nano-Sensory Applications for Studying-Elaboration of Detecting Model of Pathogenic Microorganisms". She is the member of scientific team elaborated successful international and local Scientific Projects: SENS-ERA, FP7-INCO-2011-6 (2013); International Science and Technology Centre (ISTC) grants (2006-2009, 2003-2004); Georgia National Science Foundation (GNSF) grant (2006-2008). She has been a participant and member of organizing committees of international and national scientific conferences, workshops. She is an author up to 70 scientific publications, text books, Principle of Master Program at GTU. Her research interests mainly focus on oscillation, scattering, spectral properties of nano-micro-particles, EM-wave & particles interaction, applied electrodynamics, teaching general physics, modeling, simulation.

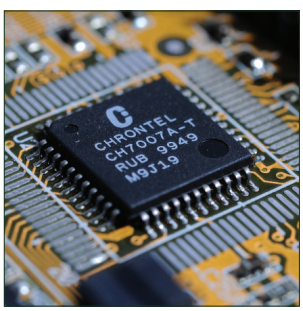
e: tamar.bzhalava@gtu.ge

allied academies

Accepted Abstracts

Physics & Laser Tech 2019



International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Some critical problems of the physical design and performance of electronic and optical materials, assemblies and systems: Application of analytical modelling

Ephraim Suhir
Portland State University, USA

Some critical problems of the mechanical behavior and performance of electronic and optical materials, assemblies and systems are addressed and discussed. It is shown that application of analytical modeling (always confirmed by finite-element-analyses) enables to reveal and explain the underlying physics associated with such, often non-obvious, always non-trivial and sometime even paradoxical, problems. Some of the addressed problems are: interfacial thermal stresses in adhesively bonded or soldered assemblies and application of inhomogeneous attachments for lower thermal stresses; thermal and lattice mismatch stresses in semiconductor crystal grown assemblies; dynamic response of electronic systems to shocks and vibrations; stress relief in solder joints owing to their elevated stand-off heights; using inhomogeneous solder joint systems for lower thermal stresses; thermal stress in flexible electronics; incentive for mechanical pre-stressing of accelerated test specimens subjected to thermal loading; stress relief in thermoelectric module designs using thinner and longer legs; low-temperature micro-bending of long-haul dual-coated optical fibers; two-point bending of optical fiber specimens. It is concluded that while all the three basic approaches in microelectronics and photonics materials science and engineering - analytical (mathematical) modeling, numerical modeling (simulation) and experimental investigations - are equally important in understanding the physics of the materials behavior and in designing, on this basis, viable and reliable electronic devices and products, analytical modeling occupies a special place owing to its ability to provide clear and concise information of the problems it addresses.

e: suhire@aol.com

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Multi-photon near-infrared emission saturation nanoscopy using upconversion nanoparticles

Fan Wang, Chaohao Chen, Shihui Wen, Qian Peter Su, Mike C L Wu, Yongtao Liu, Baoming Wang, Du Li, Xuchen Shan, Mehran Kianinia, Igor Aharonovich, Milos Toth, Shaun P Jackson, Peng Xi and **Dayong Jin**
University of Technology Sydney, Australia

Multiphoton fluorescence microscopy (MPM), using near infrared excitation light, provides increased penetration depth, decreased detection background and reduced phototoxicity. Using stimulated mission depletion (STED) approach, MPM can bypass the diffraction limitation, but it requires both spatial alignment and temporal synchronization of high power (femtosecond) lasers, which is limited by the inefficiency of the probes. Here, we report that upconversion nanoparticles (UCNPs) can unlock a new mode of near-infrared emission saturation (NIRES) nanoscopy for deep tissue super-resolution imaging with excitation intensity several orders of magnitude lower than that required by conventional MPM dyes. Using a doughnut beam excitation from a 980 nm diode laser and detecting at 800 nm, we achieve a resolution of sub 50 nm, 1/20th of the excitation wavelength, in imaging of single UCNP through 93 µm thick liver tissue. This method offers a simple solution for deep tissue super resolution imaging and single molecule tracking.

e: fan.wang@uts.edu.au

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Re-inventing bone surgery with CARLO®

Alfredo Emilio Bruno
Advanced Osteotomy Tools AG, Switzerland

Advanced Osteotomy Tools AG (AOT) is reinventing bone surgery with the world's first, proprietary medical robot, CARLO® (Cold Ablation Robot-guided Laser Osteotome), that cuts bone using cold laser ablation mechanism of action instead of mechanical tools. Although robotic surgery is in vogue, existing devices are actually telemanipulators or positioning aids, where the actual surgical activity continues to be performed by surgeons using conventional mechanical cutting instruments that cannot track the movements of the patient endangering their safety. Alternatively, CARLO® performs contact free interventions enabled by laser light so that, at no time, a mechanical instrument is in contact with the patient and the incision can be interrupted instantaneously if necessary. CARLO® comprises a tactile and certified medical robot, a laser head with a specially developed bone cutting laser, a navigation system and the driving software with a touch-screen based GUI. In this way, the procedure is 100% digital, from the 3D planning to the execution of the cut.

Until now it was impossible to use a laser for bone cutting in surgery, mostly because the lasers and/or the mechanism-of-action employed resulted in the narcotization's of the surrounding bone tissue precluding healing. AOT succeeded in developing a miniaturized laser and a proper cooling method so that the cut surfaces are not exposed to heat facilitating healing. Besides, the debris particles are ejected in contraposition with surgeries based on mechanical cutting tools that are squeezed into the porous bone structure. Another advantage is the implementation of functional cutting geometries, strengthening primary stability in combination with bio-resorbable implants would replace screwed solid metal implants in almost straight cuts. The focused laser beam is always sharp and sterile and the rendered contacts- and debris-free cuts displays superhuman precision. The real-time analysis of the ejected debris will allow detection of tumor using artificial intelligence replacing conventional biopsies.

e: alfredo.bruno@aot.swiss

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

In-situ laser interference modulated MBE growth of site-controlled quantum dots

Changsi Peng[1,2], Zhenwu Shi[1], Dayun Huo[1], Changwei Deng[1], Chen Chen[1], Linyun Yang[1], Lili Miu[1] and **Xinning Yang[1]**

[1]Soochow University, China

[2]University of Bedfordshire, UK

We have demonstrated a new approaching to grow defect-free site-controlled epitaxial quantum dots (QDs) by MBE. A unique novel MBE system was designed by combining an III-V epitaxial growth capability with in-situ direct laser interference nano-patterning (LINP). Indium atoms are selectively desorbed away from the GaAs substrate at points of high light intensity generated within the in-situ laser interference patterns, encouraging selective nucleation and resulting in the highly controllable periodic formation of two dimensional defect-free QDs arrays.

Nanostructured materials are at the forefront of 21st century device innovation. The path of technological progress now takes us to dimensions of a few nanometers, at which structured materials interact at the dimensions of molecules and have electronic properties governed by quantum interactions. There is enormous potential to transform our approaches to computing, sensing, communications, diagnosis and even perhaps the treatment of disease. Yet we do not possess all the tools to develop the devices required at this challenging dimension. We need to explore innovative production methods which could overcome the limitations of conventional routes and become key enabling technologies for the second quantum revolution. Our research on site-controlled QDs is one such novel approach, which seeks to develop a transformational process for quantum-structure-arrays (QSAs). The method combines the top-down LINP with the capabilities of bottom-up structuring by self-assembly, to provide a cost-effective state of the art capability for next generation ordered QSAs. The resulting arrays will have unprecedented site and dimensional control and will be free of process defects.

e: changsipeng@suda.edu.cn

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

New technical concepts for velocity map imaging in a THz streak camera

Mamuna Anwar
University of Hamburg, Germany

In this presentation the development of a novel type of streak-camera enabling multi-dimensional electron spectroscopy implying energy, angular as well as time resolution is reported. The new setup is based on a Velocity Map Imaging (VMI) spectrometer in collinear geometry for electron spectroscopy and Terahertz streaking adding time resolution to the setup. A highly efficient detection scheme being operational at comparably bad vacuum conditions allows for highest target densities up to 3 x 1022/m3 making the setup particularly suited for low photon flux laboratory sources. The detection efficiency is explicitly calculated. In the proof of principle experiment xenon photoelectrons are streaked and the ionizing and streaking pulses are characterized.

e: mamuna.anwar@desy.de

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Multiphase flow physics in aerospace technologies

Ivan Alexeevich Amelyushkin
Central Aerohydrodynamic Institute (TsAGI), Russia

Multiphase flow physics is essential in large variety of practical applications: e.g. aircraft icing, erosion and ablation in dusty atmospheres, combustion, medicine and space problems. Despite numerous experimental and numerical investigations, some physical peculiarities of supercooled droplets crystallization physics understanding as well as nonspherical particles motion simulation in nonuniform flows are not complete. Panoramic optical methods could be essentially improved in order to get more information from wind tunnel experiments. Mathematical models and numerical algorithms for calculating the motion of nonspherical ice crystals in inhomogeneous media have been developed and compared with corresponding experimental results. Methods for inverse problems of disperse flows parameters determination via analysis of panoramic optical measurements data were developed. Based on the results of experimental studies, dependencies of the characteristics of the crystallization of a supercooled liquid in the problem of icing of aircraft were obtained. Physical peculiarities were discovered and experimentally fixed. Methods of molecular physics were used to estimate supercooled droplets crystallization features parameters. Computational algorithms and mathematical models for dispersed flows interaction with a solid surface control at the molecular level were developed. Results of parametrical investigations are obtained as well as corresponding illustrations.

e: Amelyushkin_Ivan@mail.ru

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Internal quantum efficiency of UV µLED chips for display

Yoshihiko Muramoto, Masahiro Kimura and **Akihiro Kondo**
Nitride Semiconductors Co., Ltd., Japan

Micro light emitting diode (µLED) displays have been in development. When using three-color, i.e., red, blue, and green LEDs, or blue LEDs that excite red and green phosphors, many challenges arise in mass production, cost, and quality. Our group has devised an ultraviolet (UV)-excited red, green, and blue (RGB) display that excites red, green, and blue phosphors using UV-LEDs. Tests confirm that the display's efficiency is improved by the use of the micro-sized UV-LED chips that emit in the near-ultraviolet range. The UV µLED chip emitting at 385 nm exhibited a more linear output than a 400-nm purple µLED chip. This study examines how the composition and crystal defects of a light-emitting layer affect the light emission efficiency of a UV µLED chip from the perspective of internal quantum efficiency (IQE).

e: muramoto@nitride.co.jp

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

How an artificial Kerr-Newman black hole can release gravitational waves?

Andrew Walcott Beckwith
Chongqing University, China

We initiate a model of an artificially induced Kerr-Newman black Holes, with specific angular momentum J, and then from there model was to what would happen as to an effective charge, Q, creating an E and B field, commensurate with the release of GWs. The idea is that using a frame of reference trick, plus E + i B = - function of the derivative of a complex valued scalar field, as given by Appell, in 1887, and reviewed by Whittaker and Watson, 1927 of their "A Course of Modern Analysis" tome that a first principle identification of a B field, commensurate with increase of thermal temperature, T, so as to have artificially induced GW production. This is compared in part with the Park 1955 paper of a spinning rod, producing GW, with the proviso that both the spinning rod paper, and this artificial Kerr-Newman Black hole will employ the idea of lasers in implementation of their respective GW radiation. The idea is in part partly similar to an idea the author discussed with Dr. Robert Baker, in 2016 with the difference that a B field would be generated and linked to effects linked with induced spin to the Kerr - Newman Black hole. We close with some observations about the "black holes have no hair" theorem, and our problem. Citing some recent suppositions that this "theorem" may not be completely true and how that may relate to our experimental situation. We close with observations from Haijicek, 2008 as which may be pertinent to Quantization of Gravity.

e: rwill9955b@gmail.com

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

H-shaped fishnet metamaterial sensor for sub-terahertz region

Cumali Sabah and **Ahmet Faruk**
Middle East Technical University - Northern Cyprus Campus (METU-NCC), Turkey

Terahertz region provides us lots of advantages and the number of devices that are using THz waves is increasing day by day. Metamaterials are artificial materials which can help us to do unachievable goals by their exotic electromagnetic properties. Metamaterials are started to be used widely in different devices like lenses, antennas, modulators and sensors and THz region is one of the most contributed region of electromagnetic spectrum by metamaterials. In this study we design a fishnet metamaterial sensor that can detect materials from their electromagnetic properties and also can detect the thickness of that material by using THz waves. The proposed design is unique and both side of the sensor can be used for sensing which increases the efficiency and for some cases applicability of the sensor. Firstly frequency resonances were found and from the surface current and electric field distributions the theory behind the frequency resonances has been described. The material that is going to be detected was added to the structure as single and double overlayer and the frequency shifts at the resonance have been observed against different dielectric constant and thickness values. The material that is going to be detected can be detected from that frequency shift values. The sensitivity of the proposed sensor was calculated and compared with the existing ones and the applicability of the sensor is proved.

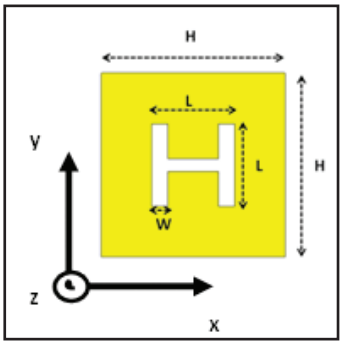


Figure 1. Front view and side view of proposed structure

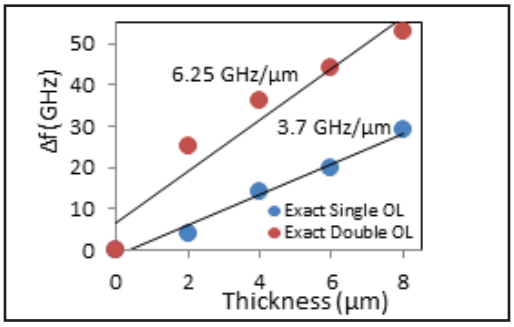


Figure 2. Frequency shift of Fishnet MTM versus Double and Single overlayer thickness with the fitted curves

e: sabah@metu.edu.tr

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Evaluation impact count recovery model on standardized uptake value used in PET-CT

Hamed Farag and **Ahmed Abdel Mohymen**
Cairo University, Egypt

Evaluation of effect of lesion size and sphere to background ratio (SBR) on the threshold used for PET tumor volume delineation.

Evaluation effect and accuracy of recovery coefficient (RC) model on standards uptake value (SUV) of different inner size diameters filled with different activity concentration and apply this model on small cohort of patients and construct Look Up Table (LUT) for different lesions with different sizes. A cylindrical phantom equipped with different volume hollow spheres was used. Two different reconstruction algorithms were applied in this study; one of them modified with Point Spread Function (the other did not base on PSF).

Partial volume effect (PVE) was highly dominant in low uptake spheres although it had large size, i.e., not only small size object affecting by PVE but also low activity concentration object. For true volume measurements, practically TrueX algorithm was more accurate when activity measurements dal with true measured volumes.

Also, the results showed using that phantom study had successfully provided "Look Up Table" for the partial volume correction of spherical lesions at maximum measured activity ratios that were typically noted in human PET-CT imaging. The present study demonstrated that SBR have not significant effect on the estimation of volumes from PET images in the different SBRs. The only determining factor for the threshold for PET volume estimation was the size of the sphere. Superior percent accuracy was shown for OSEM algorithm when applying RC model to corrected SUV values and OSEM was more efficient and less error variation with respect to sphere volume, but in case of uncorrected data, no remarkable difference between TrueX and OSEM algorithm had been observed.

e: hamedfarag103@hotmail.com

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Structural and optical properties of upconversion CuInS/ZnS quantum dots

Magdy Ali, Jehan El Nady, Shaker Ebrahim and **Moataz Soliman**
Alexandria University, Egypt

A facile one-pot method to synthesis CuInS/ZnS (CIS/ZnS) QDs was developed. The prepared CIS/ZnS QDs exhibit bright emission. Moreover, the upconversion photoluminescence (PL) of the CIS/ZnS QDs was explored. Interestingly, extraordinary excitation-independent emission for both up and down conversion fluorescence of the CIS/ZnS QDs were observed. Analysis of X-ray diffraction (XRD) of CIS/ZnS QDs shows chalcopyrite crystal structure. The high-resolution transmission electron Microscopy (HRTEM) images demonstrated crystalline CIS/ZnS QDs in spherical shape with average diameter size of 2.5 nm and 3.6 nm for CIS and CIS/ZnS, respectively. The selected area electron diffraction (SAED) suggests that the prepared CIS/ZnS QDs are poly-crystalline with 0.32 nm lattice distance. The optical properties of CIS and CIS/ZnS QDs were evaluated. The PL peaks position are almost constant and exhibit a strong peak at about 640 nm for both up and down conversion emission with a linear relationship between the intensity of the PL emission peaks and various excitation wavelengths.

e: igsr.magdyali@alexu.edu.eg

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Physical basis of shape memory effect and reversibility in shape memory alloys

Osman Adiguzel
Firat University, Turkey

A series of alloy system take place in a class of smart materials due to stimulus response to external effect. Shape memory alloys take place in this class by exhibiting a peculiar property called shape memory effect. This phenomenon is characterized by the recoverability of two certain shapes of material at different temperatures. Shape memory materials are used as shape memory devices in many interdisciplinary fields such as medicine, metallurgy, building industry and many engineering fields. Shape memory effect is performed thermally by heating and cooling after first cooling and stressing treatments. Shape memory effect is result of successive crystallographic transformations; thermal and stress induced martensitic transformations. Shape memory alloys exhibit another property called superelasticity, which is performed by stressing material at high temperature parent phase region. This effect exhibit classical elastic material behavior and it is performed by stressing and releasing the material in parent phase region. Loading and unloading paths are different in stress strain diagram, and cycling loop reveals energy dissipation. The strain energy is stored after releasing, and these alloys are mainly used as deformation absorbent materials in control of civil structures subjected to seismic events, due to the absorbance of strain energy during any disaster or earthquake.

Thermal induced martensitic transformation is first order lattice-distorting phase transformations, and thermally occurs on cooling, by which ordered parent phase structures turn into twinned martensitic structures. This transformation occurs with cooperative movements of atoms by means of lattice invariant shear. Lattice invariant shears occur in two opposite directions, <110 > -type directions on the {110} - type planes of austenite matrix which is basal plane of martensite. Thermal induced martensite occurs as twinned martensite, and the twinned structures turn into the detwinned structures by means of stress induced martensitic transformation by stressing the material in the martensitic condition.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based structures at high temperature parent phase field. Lattice invariant shear and twinning is not uniform in copper based ternary alloys and gives rise to the formation of complex layered structures, depending on the stacking sequences on the close-packed planes of the ordered parent phase lattice, like 3R, 9R or 18R depending on the stacking sequences on the close-packed planes of the ordered lattice. Crystal structure of martensite of these alloys is orthorhombic and basal plane is hexagonal.

In the present contribution, x-ray diffraction and transmission electron microscopy (TEM) studies were carried out on two copper based CuAlMn and CuZnAl alloys. X-ray diffraction profiles and electron diffraction patterns reveal that both alloys exhibit super lattice reflections inherited from parent phase due to the displacive character of martensitic transformation. X-ray diffractograms taken in a long time interval show that diffraction angles and intensities of diffraction peaks change with the aging duration at room temperature. In particular, some of the successive peak pairs providing a special relation between Miller indices come close each other. This result refers to the rearrangement of atoms in diffusive manner.

e: oadiguzel@firat.edu.tr

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Improving laser powder bed fusion additive manufacturing by X-ray tomography

Anton Du Plessis[1], **Igor Yadroitsev**[2] and **Ina Yadroitsava**[2]
[1]Stellenbosch University, South Africa
[2]Central University of Technology, South Africa

Laser powder bed fusion (LPBF) is a form of additive manufacturing which allows detailed and complex functional components to be manufactured – recently in many new organic and biomimetic designs. This technology has the potential to disrupt the manufacturing industry through its freedom of design and new paradigm of complexity in parts that can be produced. Despite this potential, the processes need to be optimized to achieve acceptable mechanical properties and enhance the reliability of these types of parts. Using X-ray tomography to inspect final parts is one technique which has become almost routine in this industry – the non-destructive nature and the insights provided outweigh the costs involved. What is not well known yet – is that the laser powder bed fusion processes may be optimized using the technique in many other ways than simply inspecting the final part. The powder feedstock can be analyzed for sphericity, lack of porosity and lack of impurities. Small coupon samples can be analyzed for micro porosity distribution – this provides insight into defect formation regimes and can assist in optimizing the scan strategy, hatch spacing, contour scanning parameters or the laser power or scan speed, for example. Different regimes of process inaccuracy lead to different types, shapes and distributions of micro porosity, which is visualized by X-ray tomography. Finally, these distributions translate into the final complex parts which will be demonstrated. Finally, small coupon samples called witness specimens are built alongside the complex part and are used as reference for analysing the micro porosity and defects formed during the process – for example for layered stop-start flaws. Examples of all of these will be discussed in the presentation, in the context of improving and refining additive manufacturing processes.

e: anton2@sun.ac.za

Notes:

allied academies

International Conference on

Applied Physics & Laser, Optics and Photonics

April 15-16, 2019 | Frankfurt, Germany

Lewis-Riesenfeld quantization and SU(1,1) coherent states for 2D damped harmonic oscillator

Latévi Lawson, Gabriel Avossevou and **Laure Gouba**
Institut de Mathématiques et de Sciences Physiques (IMSP), Bénin

The study of dissipative systems have remained over the past years a constant source of fascination, inspiration and innovation in different branches of sciences. The study of this in quantum physics framework has been critized for violating certain laws of quantum theory. Thus, in this paper we tackle these issues and we provide a simple and complete solution for this problem in two dimensions. To do so, we use the algebraic method of operators based on the Lewis-Riesenfeld invariant procedure. Finally, from the solution of the Schrodinger equation of this system, we derive the generators of SU(1,1) Lie algebra and we construct the corresponding coherent states and study the related proprieties.

e: lawmenx@gamil.com

Notes: