

**BULGARIAN ACADEMY OF SCIENCES**  
**GEORGI NADJAKOV INSTITUTE OF SOLID STATE PHYSICS**  
22<sup>nd</sup> INTERNATIONAL SCHOOL ON CONDENSED MATTER PHYSICS  
“**State of the Art in Functional Materials & Technologies**”  
August 29<sup>th</sup> – September 2<sup>nd</sup>, 2022 – Varna, Bulgaria

**PROGRAM**

**August 28th** (Sunday)

16:00-18:00            Registration  
**20:00**                    **Get Together Party August 28th** (Sunday)

**August 29th** (Monday)

09:10-09:30            Opening Ceremony

**09:30-11:00**            **Chair: H. Chamati**  
09:30-10:15            I. MIHAILESCU, “Direct Energy Deposition of Functional Materials  
via Laser Additive Manufacturing: Process Modeling versus  
Experimental Verification”  
*Georgi Nadjakov Memorial Lecture*

10:15-11:00            S. REYNOLDS, “Carrier transport and dielectric properties of  
methylammonium lead halide perovskite single crystals”  
*Milko Borisov Memorial Lecture*

11:00-11:30            Coffee break / Collective photo

**11:30-12:30**            **Chair: E. Iordanova**  
11:30-12:10            I. BINEVA, “AFM and XRD - the powerful combination for  
nanostructured thin films characterization”

12:10-12:30            K. BUCHKOV, “Magneto-optical and multiferroic properties of  
transition-metal (Fe, Co or Ni)-doped ZnO layers deposited by ALD”

12:30-16:00            Lunch break

**16:00-18:00**            **Chair: A. Iglič**  
16:00-16:40            S. KRALJ, “Domain-like structures in physical fields”  
16:40:17:00            D. GEORGIEVA, “An electrochemical impedance spectroscopy  
study of the influence of miltefosine on lung cancer cells and  
endothelial cells”

17:00-18:00            Five minutes’ presentations of posters of young participants

**August 30th** (Tuesday)

**09:10-10:30**            **Chair: S. Kralj**  
09:10-09:50            N. POKLAR ULRIH, “Archaeolipids and their potential use as a  
coating material”  
09:50-10:30            P. SANTHOSH, “Archaeosomes: Next-generation liposomes based  
on archaeal lipids for drug delivery and biomedical applications”

- 10:30-11:00 Coffee break
- 11:00-12:20 Chair: N. Poklar Ulrih**  
 11:00-11:40 E. IORDANOVA, “The future is vast: Regenerative medicine perspectives and technology trends in advanced implantable biomaterial strategies”  
 11:40-12:20 A. IGLIČ, “Hydrothermally synthesized TiO<sub>2</sub> nanostructures”
- 12:20-16:00 Lunch break
- 16:00-17:40 Chair: N. Nedyalkov**  
 16:00-16:40 F. BALESTRA, “Challenges and solutions for high performance green nanoelectronics devices and materials”  
 16:40-17:20 A. VASEASHTA, “Hierarchical integration of electrospinning and 3D/4D printing process for prototyping of smart structures”  
 17:20-17:40 K. LOVCHINOV, “Investigations of zirconium oxide layers obtained by electrochemical process at different temperatures”
- 17:40-19:00 First poster session**

**August 31st (Wednesday)**

- 09:10-10:30 Chair: I. Bineva**  
 09:10-09:50 P. MONTGOMERY, “Characterization of functional materials using coherence scanning interferometry and environmental chambers”  
 09:50-10:30 P. PETRIK, “Nanomaterials at interfaces for optical sensing”
- 10:30-11:00 Coffee break
- 11:00-12:20 Chair: S. Baranovskii**  
 11:00-11:40 Ph. VANDERBEMDEN, “Joule resistive heating of a shape memory composite: some design rules to predict the temperature in samples with rectangular cross-section”  
 11:40-12:20 T. KOUTZAROVA, “Phase transitions in magneto-electric hexaferrites”
- 12:20-16:00 Lunch break
- 16:00-17:40 Chair: Ph. Vanderbemden**  
 16:00-16:40 S. BARANOVSKII, “Effects of alloy disorder in organic and inorganic semiconductors”  
 16:40-17:00 N. IVANOV, “Mixed-spin kagome strips”  
 17:00-17:20 N. IVANOVA, “Physical properties of SOPC at low temperatures through the Slipid force field”  
 17:20-17:40 E. ANGELOVA, “Dynamic simulation of the quasiparticle excitations spectra”
- 17:40-19:00 Second poster session**

## September 1st (Thursday)

<b>09:10-10:30</b>	<b>Chair: E. Guziewicz</b>
09:10-09:50	D. MALKA, "Controlling high speed mach zehnder modulator quadrature bias point using Si PIN diode phase-Shifter"
09:50-10:30	T. HRISTOVA-VASILEVA, "Silver and gold containing compounds of p-block elements as perspective materials for plasmonics"
10:30-11:00	Coffee break
<b>11:00-12:20</b>	<b>Chair: A. Paskaleva</b>
11:00-11:40	E. GUZIEWICZ, "Acceptor doping of zinc oxide – defect complexes in nanoscale"
11:40-12:20	S. BANERJEE, "Designing electrode architectures across length scales: Some lessons learned from Li-ion and "Beyond Li" Chemistries"
12:20-16:00	Lunch break
<b>16:00-17:20</b>	<b>Chair: S. Banerjee</b>
16:00-16:40	M. FABIAN, "Investigation of the surface reactivity of a carbon steel container exposed to different types of environments and conditions"
16:40-17:20	M. GEORGIEV, "Single-molecule magnets: The huge zero-field splitting revisited"
17:20-17:40	Coffee break
<b>17:40-18:20</b>	<b>Chair: M. Fabian</b>
17:40-18:00	I. TOLNAI, "Stabilization and characterization of simulated liquid radioactive waste in a new type of cement mixture"
18:00-18:20	M. SHEHADI, "Measurement of nonlinear optical characteristics of GaN using femtosecond z-scan technique"
<b>20:00</b>	<b>Farewell Dinner</b>

## September 2nd (Friday)

<b>09:10-11:30</b>	<b>Chair: N. Ivanov</b>
09:10-09:50	Z. DANIEL, "Star polymer chains in confined geometries: theory and simulations"
09:50-10:30	V. ČELEBONOVIC, "The Hubbard model and optics of 2D materials"
10:30-11:00	Coffee break
<b>11:00-12:30</b>	<b>Chair: H. Chamati</b>
11:00-11:20	G. YANKOV, "Ablation damage and threshold in transparent media - case study at ns, ps and fs laser pulses"
11:20-11:40	H. KODURU, "Optical properties of multi-layers structured PEO/PVP solid polymer membranes doped with sodium perchlorate"
<b>11:40</b>	<b>Closing Ceremony</b>

## POSTER PRESENTATIONS

### 1. FIRST POSTER SESSION, August 30<sup>th</sup> (Tuesday)

- 1.1. G. Exner – Effect of the nanofiller concentration on its dispersion in a system of liquid crystalline SB(3R)-11 and single wall carbon nanotubes
- 1.2. J. Halun – Investigation of ideal star polymers in confined geometries
- 1.3. Y. Marinov – PEO/Starch-nanocrystals based Solid Polymer Electrolyte Membranes for Magnesium – Ion Conducting Applications
- 1.4. Y. Marinov – Volatile organic compound vapor sensing with nano-thin Langmuir-Blodgett phospholipide monolayer
- 1.5. M. Marudova - Formulation and characterization of Benzylamine loaded casein/chitosan nanocomplexes
- 1.6. P. Kuterba – Numerical calculations of the monomer density profiles of real ring polymer chains in a slit geometry of two parallel walls with mixed b.c.
- 1.7. A. Grigorov – Benzylamine hydrochloride immobilization in multilayer structures based on lyophilized polylactic acid and poly( $\epsilon$ -caprolactone)
- 1.8. B. Katranchev – Graphene oxide induced sub-structures of bi-tilted smectic CG in dimer liquid crystals
- 1.9. D. Christova – Surface Modification of Polyethersulfon Nanofiltration Membrane for Improving Water-Ethanol Separation
- 1.10. E. Pisanova – On the Critical Specific Heat Capacity of a Model of Structural Phase Transitions with Long-range Interaction
- 1.11. G. Hadjichristov – Thin films of nanocomposites from glassy-state tris(keto-hydrozone) discotic liquid crystals and single-walled carbon nanotubes, for optoelectronics
- 1.12. G. Ivanov – Gas Sensing of Volatile Organic Compounds by Arachidic Acid Langmuir-Blodgett Sensing Layers and Electrical Impedance Spectroscopy
- 1.13. G. Mihova – Comparative Study of Protective Coating Properties of CR-39 Based Ophthalmic Lenses
- 1.14. G. Zsivanovits - Chitosan/grapeseed oil multicomponent edible films – design and properties
- 1.15. J. Genova – Effect of pressure and cross-flow velocity on membrane behavior in red wine nanofiltration
- 1.16. M. Lazarova – Effect of Driving Pressure and Flux Rate on Red Wine Nanofiltration
- 1.17. R. Kamburova – Soliton dynamics in two ferromagnetic chains coupled through interactions between opposite and diagonal spins
- 1.18. S. Georgiev – Doping of dilute nitride compounds grown by liquid phase epitaxy
- 1.19. S. Milenkova – Chitosan-based particles by emulsion crosslinking
- 1.20. S. Minkovska – Photoswitchable photochromic fluorescent spirooxazine derivative for metal ions sensing: Photophysical properties and quantum-chemical calculations
- 1.21. T. Vlakov – Dielectric spectroscopy study of composite PEO/E8 (polymer/ liquid crystals) soft-matter thin films for flexible electronics
- 1.22. Y. Dimitrova – Metal-Organic Frameworks with Lanthanoid Ions and Trimesic Acid, as Sensors for Water Pollutants
- 1.23. P. Karakashkova – Photodegradation of adipic acid in aqueous solution by Au and Pd doped TiO<sub>2</sub> nanocomposite catalysts under UV irradiation
- 1.24. K. Esmeryan – Impact dynamics of water droplets on pre-frosted superhydrophobic carbon soot coatings

- 1.25. R. Gergova – Investigation of Al-doped ZnO thin films prepared by electrochemical deposition method for gas-sensing applications
- 1.26. P. Kolev – Spectral polarimetry applied for magnetic field detection
- 1.27. M. Petrov – Study of the properties of supercapacitors derived from soot treated with perchlorethylene
- 1.28. E. Korutcheva – The Restricted Boltzmann Machine Ansatz for Quantum Spin-Glass System
- 1.29. E. Stoyanova – Design and Elaboration of Various Multilayer Beamsplitters

## **2. SECOND POSTER SESSION, August 31<sup>st</sup> (Wednesday)**

- 2.1. Sv. Baranovskii – Light-Induced Nucleation and Optical Absorption in Metallic Vapors
- 2.2. A. Paskaleva – Electric characterization of transition metal (Co, Ni, Fe) doped ZnO thin layers prepared by atomic layer deposition
- 2.3. V. Donchev – Surface photovoltage study of metal halide perovskites deposited directly on crystalline silicon
- 2.4. B. Georgieva – Characterization and gas sensing properties of ZnO and ZrO<sub>2</sub> layers electrochemically-synthesized on quartz resonators
- 2.5. D. Ivanova – Improvement of the photocatalytic properties of ZnO thin films by co-catalytic modifying for the degradation of Paracetamol
- 2.6. G. Alexieva – Impact of the deposition temperature on morphological and gas sensing properties of electrochemically grown ZrO<sub>2</sub> layers
- 2.7. L. Slavov – Influence of the substrate on the structural and optical properties of ZrO<sub>2</sub> layers deposited by electrochemical process
- 2.8. P. Ivanov – Study of spectrofluorometric sensitivity and structural properties of electrochemical ZrO<sub>2</sub> layers
- 2.9. P. Petrova – Structural and gas sensing properties of nanostructured ZrO<sub>2</sub> layers deposited electrochemically at different times
- 2.10. S. Stankova – Preparation and characterization of RF sputtered ZnO layers for application in thin films solar cells
- 2.11. R. Dzhurkova – Optical and photocatalytic properties of ZnO thin films prepared by modified sol-gel method
- 2.12. V. Dzhurkov – Investigation of porous ZnSe thin films prepared by thermal evaporation
- 2.13. A. Atanasova – Surface plasmon-like properties of one dimensional photonic crystal and its application in surface-enhanced luminescence
- 2.14. R. Todorov – Structural and optical characterization of thin films from Bimetallic Au-Sb system as tunable plasmonic material for UV spectral range
- 2.15. V. Katrova – Thickness dependence of the optical properties of thin Ag-Bi films and their surface plasmon-enhanced photoluminescence capability
- 2.16. D. Spasov – Interfaces in very thin ALD Al<sub>2</sub>O<sub>3</sub>/HfO<sub>2</sub> stacks studied by ellipsometry
- 2.17. I. Miloushev – Investigation of optical constants of Al<sub>2</sub>O<sub>3</sub> films in the spectral range 0.2 - 0.8 microns
- 2.18. T. Stanchev – Charge trapping effects in nonvolatile memory cells with HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> nanolaminated trapping layer
- 2.19. Ts. Ivanov – Electric breakdown characteristics of ALD HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>-based memory capacitors
- 2.20. M. Beshkova – AlN films grown by plasma enhanced atomic layer deposition

- 2.21. N. Nedyalkov – Effect of Ag on the glass formation ability and luminescence properties of Eu<sup>3+</sup> doped ZnO-B<sub>2</sub>O<sub>3</sub>-WO<sub>3</sub>-Nb<sub>2</sub>O<sub>5</sub> glasses
- 2.22. I. Avramova – X-ray photoelectron spectroscopy investigation on thermally treated iron-rich oxide glasses
- 2.23. I. Mihailova – Physicochemical and structural characterization of silicate glasses and glass-ceramics containing iron oxides
- 2.24. R. Harizanova – Phase composition and microstructure characterization of strontium-modified barium titanate glass-ceramics
- 2.25. Ch. Ghelev – Influence of Al-substitution on the Structure and Magnetic Properties of BaFe<sub>12</sub>O<sub>19</sub> Obtained by Modified Co-precipitation Methods
- 2.26. B. Blagoev – Growth of Fe Oxide Nanofilms by Atomic Layer Deposition
- 2.27. Ch. Angelov – Variation of UV-A/UV-B daily profiles depending on location and altitude
- 2.28. Ch. Angelov – Remote datalogging of solar UV irradiation using open-source ESP32 platform and MQTT protocol
- 2.29. S. Karatodorov – Laser-Induced Periodic Surface Structuring of Wide Bandgap Transparent Materials