

BULGARIAN ACADEMY OF SCIENCES
GEORGI NADJAKOV INSTITUTE OF SOLID STATE PHYSICS
21ST INTERNATIONAL SCHOOL ON CONDENSED MATTER PHYSICS
“Progress and Perspectives in Functional Materials”
August 31ST - September 4th, 2020 – Varna, Bulgaria

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P R O G R A M M E

August 30th (Sunday)

16:00-19:00 Registration
20:00 **Get Together Party**

August 31st (Monday)

09:00-09:30 Opening Ceremony

09:30-11:00 **Chair: H. Chamati**

09:30-10:15 S. BALESTRA, “Challenges and possible solutions for the end of the
nanoelectronic roadmap”

Georgi Nadjakov Memorial Lecture

10:15-11:00 Ph. VANDERBEMDEN, “Partial discharge measurements used as a
tool to assess the quality of the electrode contact in flash sintering”

Milko Borisov Memorial Lecture

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

11:30-12:50 **Chair: H. Chamati**

11:30-12:10 I. MIHAILESCU, “Thin films fabrication for biomedical applications
in: drug delivery systems, biosensors, advanced sensor coatings and
antinosocomial infections”

12:10-12:30 N. KRASTEVA, “PEGylation of graphene oxide nanosheets modulate
cancer cell mobility and proliferate ability”

12:30-12:50 K. ESMERYAN, “Anti-frosting performance of chemically
functionalized super-nonwetable carbon soot coatings”

12:50-16:00 Lunch break

16:00-18:00 **Chair: D. Nesheva**

16:00-16:40 M. FABIAN, “Structural characterization of oxy-halide materials for
solid state batteries”

16:40-18:00 Five minutes’ presentations of posters of young participants

September 1st (Tuesday)

09:10-10:30 **Chair: J. Genova**

09:10-09:50 Y. A. ERMAKOV, “Lipid membrane interface - from electrostatics to
molecular structure”

09:50-10:30	A. IGLIČ, “Plasma treated titanium nanostructures for modification of stents”
10:30-11:00	Coffee break
11:00-12:20	Chair: J. Genova
11:00-11:40	S. KRALJ, “Multifunctional topological defect-based soft materials”
11:40-12:20	O. BATISHCHEV, “Protein-lipid interactions in viral infections”
12:20-16:00	Lunch break
16:00-18:00	Chair: J. Genova
16:00-16:40	B. RIZZUTI, “Using model transport proteins to store, control and build functional materials”
16:40-17:20	S. AKIMOV, “Evolution of continuum models of membrane fusion”
17:20-17:40	S. PENIC, “Possible mechanisms of invaginations and endovesicles formation coupled to a global shape transformation driven by non-homogeneous lateral distribution of active force”
17:40-18:00	P. SANTOSH, “Phospholipid stabilized gold nanorods: Towards improved colloidal stability and biocompatibility”
18:00-19:00	First poster session

September 2nd (Wednesday)

09:10-10:30	Chair: T. Hristova-Vasileva
09:10-09:50	P. MONTGOMERY, “Spatially-resolved optical characterization of functional materials using coherence scanning interferometry”
09:50-10:30	P. PETRIK, “Development of methods for non-destructive materials characterization”
10:30-11:00	Coffee break
11:00-12:20	Chair: T. Hristova-Vasileva
11:00-11:40	G. ARZUMANYAN, “Ultrasensitive detection of analyte molecules at attomolar concentration by Raman spectroscopy”
11:40-12:00	R. TODOROV, “Optical properties of thin Ag – In films prepared by interdiffusion in bimetallic nanolayered stacks”
12:00-12:20	T. HRISTOVA-VASILEVA, “Structural and optical properties of Au – In films for plasmonic applications”
12:20-16:00	Lunch break
16:00-18:00	Chair: T. Hristova-Vasileva
16:00-16:40	V. DONCHEV, “Dilute nitrides heterostructures grown by liquid phase epitaxy for solar cells applications”
16:40-17:00	K. LOVCHINOV, “Structural and optical properties of electrochemically deposited ZrO ₂ layers on different substrate”
17:00-17:20	S. BOYADJIEV, “An optical excitation study of pure and Ru-doped BI ₁₂ SiO ₂₀ crystals with graphene coating”
18:00-19:00	Second poster session

September 3rd (Thursday)

09:10-10:30	Chair: A. Paskaleva
09:10-09:50	M. LANZA, "Two-dimensional materials based resistive switching devices"
09:50-10:30	R. YAKIMOVA, "Towards 2D materials beyond graphene"
10:30-11:00	Coffee break
11:00-12:20	Chair: A. Paskaleva
11:00-11:40	E. GUZIEWICZ, "Influence of oxygen-rich and zinc-rich conditions on donor and acceptor states of zinc oxide"
11:40-12:20	S. BANERJEE, "Neuromorphic materials by design"
12:20-16:00	Lunch break
16:00-17:20	Chair: A. Varonov
16:00-16:40	V. ČELEBONOVIC, "Strain-tunable conductivity and reflectivity of low dimensional systems within the Hubbard model"
16:40-17:00	K. KOROUTCHEV, "Smart self-composing leaning system with functional restricted data learning from small datasets"
17:00-17:20	M. GEORGIEV, "The magnetic properties of Ni ₄ Mo ₁₂ molecular magnet: Theory and experiment"
17:20-17:40	Coffee break
17:40-18:20	Chair: A. Varonov
17:40-18:00	T. MISHONOV, "Electric oscillations generated by fluctuation cooper pairs"
18:00-18:20	A. VARONOV, "Electric field effect of cleaved superconductors surface and the problem of effective mass of supefluid charge carriers"
20:00	Farewell Dinner

September 4th (Friday)

09:10-10:30	Chair: H. Chamati
09:10-09:50	Z. USATENKO, "Dynamics of polymer chains with complicated topology in confined geometries"
09:50-10:10	S. UDACHAN, "Infrared optical constants of chromium nano-films"
10:10-10:30	I. GORBACHEV, "Investigation of a nickel clusters growth dynamic under Langmuir monolayer of arachidic acid for creation of new conductive material"
10:30-11:00	Closing Ceremony

POSTER PRESENTATIONS

1. FIRST POSTER SESSION, September 1th (Tuesday)

- 1.1. K. D. Esmeryan, S. D. Gyoshev, N. I. Stoimenov, Y. Lazarov, E. I. Radeva, Effect of physicochemical characteristics of super-nonwetable carbon soot coatings on the freezing time delay and freezing temperature depression of sessile cooled water droplets
- 1.2. I. M. Dimitrova, V. I. Yordanova, R. I. Slavchov, Mixtures of quadrupolar liquids
- 1.3. G. R. Ivanov, I. D. Avramov, V. J. Strijkova, Y. G. Marinov, T. E. Vlahov, E. Bogdanova, G. B. Hadjichristov, Mass sensitivity of Langmuir-Blodgett monolayer film coated surface acoustic wave resonators to volatile organic solvents
- 1.4. K. Koev, N. Donkov, N. Stancova, H. Naidenski, V. Kussovski, L. Avramov, Investigation of the antibacterial and antifungal effects of silver nanolayers on the ocular prosthesis coating after a two-year period
- 1.5. K. Koev, N. Donkov, N. Stancova, H. Naidenski, V. Kussovski, L. Avramov, Investigation of the antibacterial and antifungal effects of silver nanolayers on the hard contact lenses coating after one -year period
- 1.6. E. Belina, H. Kisov, I. Angelov, A. Gisbrecht, T. L. Dimitrowa, G. Dyankov, Thin layers of Hemin with sensing applications
- 1.7. A. Viraneva, A. Grigorov, N. Pankina, I. Iliev, T. Yovcheva, Effect of β -galactosidase immobilization on properties of chitosan/xanthan and xanthan/chitosan multilayers
- 1.8. S. Kasarova, N. Sultanova, Thermal variations of refractive and dispersive parameters of optical polymers
- 1.9. Y. G. Marinov, T. E. Vlahov, G. B. Hadjichristov, G. R. Ivanov, I. D. Avramov, V. J. Strijkova, I. A. Gorbachev, A. G. Petrov, Phospholipid Langmuir-Blodgett films for detection of reactive gases and vapors at room temperature
- 1.10. A. Grigorov, A. Viraneva, M. Marudova, B. Salimova, T. Yovcheva, Effect of pH and ionic strength of chitosan/casein and casein/chitosan multilayers on curcumin release
- 1.11. I. Bodurov, M. Marudova, A. Viraneva, T. Yovcheva, A. Grigorov, Investigation of polyelectrolyte multilayers deposited on corona charged composite polylactic acid / poly(ϵ -caprolactone) substrates
- 1.12. G. B. Hadjichristov, Y. G. Marinov, A. G. Petrov, T. E. Vlahov, G. R. Ivanov, H. Krishna Koduru, N. Scaramuzza, Langmuir-Blodgett nano-thin monolayers of phospholipids: electrical response to Cadmium ions
- 1.13. St. Minkova, Kr. Nikolova, E. S. Pisanova, A clustering of red wines based on physicochemical and optical properties
- 1.14. G. Gentsheva, Kr. Nikolova, A. Pashev, Optical characteristics and chemical composition of high oleic sunflower oils with herbs oil additives
- 1.15. S. Milenkova, I. Manolov, M. Marudova, Curcumin loaded casein nanogels as drug delivery systems
- 1.16. T. E. Vlahov, Y. G. Marinov, G. B. Hadjichristov, H. K. Koduru, N. Scaramuzza, Complex electrical impedance and dielectric spectroscopy of Na^+ -conducting PEO/PVP/ NaIO_4 solid polymer electrolyte with incorporated Graphene Oxide nanoparticles
- 1.17. T. E. Vlahov, B. L. Martinov, A. D. Staneva, Y. G. Marinov, G. B. Hadjichristov, Complex electrical impedance and dielectric spectroscopy studies on reduced graphene oxide (rGO)/ ZnTiO_3 nanocomposites
- 1.18. G. B. Hadjichristov, Y. G. Marinov, T. E. Vlahov, H. K. Koduru, N. Scaramuzza, Solid polymer nanocomposite electrolyte complexes PEO/PVP/ NaIO_4 with TiO_2 nano-additives: Na^+ ion conductivity and dielectric studies
- 1.19. G. B. Hadjichristov, G. K. Exner, Y. G. Marinov, T. E. Vlahov, Photo-electrical response of nanocomposites of single-walled carbon nanotubes incorporated in tris(*keto*-hydrozone) discotic mesogen

- 1.20. Z. Slavkova, N. Drinova, H. Chamati, J. Genova, Influence of carbohydrates on the phase behaviour of phospholipid systems
- 1.21. J. Genova, N. Drinova, H. Chamati, M. Petrov, Z. Slavkova, Influence of carbon nanostructures on the structural and thermal properties of lipid membranes
- 1.22. S. Panyovska, D. Dzhonova, I Tsibranska, Comparative evaluation of approaches for CFD modeling of mass transfer in membrane filtration
- 1.23. M. T. Primatarowa, R. S. Kamburova, Soliton scattering on impurities with modified exchange interactions in anisotropic ferromagnetic chains
- 1.24. S. Varbev, I. Boradjiev, H. Chamati, Single-photon generation of entangled triplet states in an atomic spin dimer
- 1.25. N. P. Nedev, E. S. Pisanova, Finite-size scaling and bulk critical behavior of a quantum spherical model with a long-range interaction: entropy, internal energy and specific heat
- 1.26. D. Yordanova, Modelling of multiple hollow cathode discharge
- 1.27. S. Varbev, I. Boradjiev, R. Kamburova, H. Chamati, Interaction of solitons with a qubit in an anisotropic Heisenberg spin chain with first and second-neighbor interactions
- 1.28. C. L. Costán, S. N. Santalla, J. Rodriguez-Laguna, E. Korutcheva, Random walkers on deformable media
- 1.29. M. Georgiev, H. Chamati, Origin of exchange interactions: localized vs. delocalized electrons
- 1.30. K. Tonova, M. Lazarova, M. Dencheva-Zarkova, I. Tsibranska, V. Stanoev, J. Genova, Separation of glucose, other reducing sugars and phenolics from natural extract by nanofiltration: effect of pressure and cross-flow velocity
- 1.31. R. S. Kamburova, M. T. Primatarowa, Bound soliton - Defect spin states in anisotropic ferromagnetic chain
- 1.32. M. Georgiev, Discrete dynamics of energy and momentum transfer

2. SECOND POSTER SESSION, September 2nd (Wednesday)

- 2.1. B. Napoleonov, V. Marinova, D. Petrova, S. Petrov, S. H. Lin, D. Dimitrov, Graphene based optical light modulators
- 2.2. B. Napoleonov, J. Mickowski, D. Petrova, V. Marinova, B. Blagoev, V. Strijkova, P. Terziyska, S. H. Lin, D. Dimitrov, Atomic layer deposited Al-doped ZnO thin films for flexible display applications
- 2.3. T. Tasheva, A. Dimitrov, Correlation between optical basicity, chemical bonding, and optical characteristics of glasses in the $\text{TeO}_2\text{-V}_2\text{O}_5\text{-MoO}_3$ and $\text{TeO}_2\text{-V}_2\text{O}_5\text{-Bi}_2\text{O}_3$ systems
- 2.4. T. Nurgaliev, M. Beshkova, Magnetic field effect in piezoelectric resonators with HTS electrodes
- 2.5. B. Martinov, S. Slavov, A. Staneva, J. Mateeva, B. M. G. Melo, L. C. Costa, Electric properties of new composites materials based on RGO, nanosized ZnO and Cu nanoparticles
- 2.6. S. Slavov, M. Noncheva, T. Peicheva, Z. Jiao, R. Harizanova, Dielectric properties of monophasic polycrystalline bismuth titanate pyrochlore ($\text{Bi}_2\text{Ti}_2\text{O}_7$) ceramics and glass-ceramics
- 2.7. T. Boyadzhieva, V. Koleva, R. Stoyanova, Synthesis and characterization of tunnel-type $\text{Na}_4\text{Fe}_3(\text{PO}_4)_2\text{P}_2\text{O}_7$ as cathode material in sodium-ion batteries
- 2.8. S. Stankova, O. Volobujeva, Hr. Dikov, M. Ganchev, Solution deposition of ZnO thin films
- 2.9. B. L. Martinov, T. E. Vlachov, A. D. Staneva, S. Slavov, Y. G. Marinov, G. B. Hadjichristov, Synthesis and characterization of nanosized ZnTiO_3 doped with of reduced graphene oxide (RGO)
- 2.10. M. Petrov, K. Lovchinov, H. Nichev, T. Hikov, L. Slavov, N. Tyutyundzhiev, Thermally stabilized soot for supercapacitors
- 2.11. A. Atanasova, T. Hristova-Vasileva, R. Todorov, Influence of the molecular weight and concentration of PVP on the polyol synthesized silver nanoparticles

- 2.12. D. Dimitrov, I. Dionisiev, K. Buchkov, H. Dikov, V. Marinova, WSe₂ thin films and crystals
- 2.13. D. Nicheva, V. Ilcheva, R. Harizanova, I. Mihailova, T. Petkova, P. Petkov, Preparation and structural investigation of BaTiO₃
- 2.14. K. Lovchinov, G. Alexieva, B. Georgieva, M. Petrov, R. Gergova, B. Georgieva, Study of the sensitivity of electrochemically-deposited ZrO₂ on a quartz resonator
- 2.15. B. Georgieva, S. Kolev, K. Krezhov, Ch. Ghelev, D. Kovacheva, L. -M. Tran, M. Babij, A. Zaleski, B. Vertruyen, R. Closset, T. Koutzarova, Magnetic phase transitions in Zn₂Y-type hexaferrites - the influence of substitutions
- 2.16. M. Beshkova, B. S. Blagoev, V. Mehandzhiev, R. Yakimova, B. Georgieva, I. Avramova, P. Terziyska, D. Kovacheva, V. Strijkova, Optimization of AlN films grown by atomic layer deposition
- 2.17. M. Beshkova, P. Deminskyi, C. -W Hsu, I. Shteplyuk, H. Pedersen, R. Yakimova, Atomic layer deposition of AlN on different type of substrates
- 2.18. H. Hristova, E. Dimova, A. Rangelov, G. Montemezzani, Quantum-optical analogy for constructing of new devices: Sagnac-type polarization independent optical isolator
- 2.19. Ts. Lazarova, D. Kovacheva, M. Georgieva, D. Tzankov, Physicochemical properties of nanosized ZnFe₂O₄ obtained by solution combustion synthesis and sonochemical synthesis
- 2.20. R. Georgiev, K. Lazarova, M. Vasileva, B. Georgieva, T. Babeva, Niobium oxide sol-gel Bragg stacks for acetone sensing with optical read-out
- 2.21. V. Dzhurkov, Z. Levi, D. Nesheva, T. Hristova-Vasileva, P. Terziyska, Properties of ZnSe nanocrystalline thin films prepared by thermal evaporation
- 2.22. R. Gegova-Dzhurkova, D. Nesheva, V. Mihailov, V. Dzhurkov, P. Terziyska, E. Manolov, Effect of infrared laser irradiation on electrical conductivity and ethanol sensitivity of sol gel ZnO thin films
- 2.23. E. Manolov, V. Dzhurkov, J. Paz, N. Nedev, D. Nesheva, Effect of high temperature annealing on the electrical properties of Metal/SiO_x/Si structures
- 2.24. D. Spassov, A. Paskaleva, E. Guziewicz, W. Wozniak, T. Stanchev, Tz. Ivanov, J. Wojewoda-Budka, M. Janusz-Skuza, Effect of blocking and tunnel oxide layers on the charge trapping properties of MIS capacitors with ALD HfO₂/Al₂O₃ nanolaminated films
- 2.25. R. Gergova, M. Sendova-Vassileva, G. Popkirov, Hr. Dikov, G. Grancharov, M.-D. Atanasova, Influence of ZnO nanoparticulates as electron transport material on the performance and shelf-life of P3HT:PCBM bulk heterojunction solar cells
- 2.26. N. Tyutyundzhiev, K. Lovchinov, Hr. Nitchev, G. Alexieva, Experimental results on photovoltaic heat pump with PCM/water thermal storage
- 2.27. N. Tyutyundzhiev, Ch. Angelov, T. Arsov, K. Lovchinov, Hr. Nitchev, G. Alexieva, Development of cost-efficient wireless network for solar UV irradiation monitoring in Bulgaria
- 2.28. Hr. Nichev, K. Lovchinov, M. Petrov, S. Koynov, N. Tyutyundzhiev, Cost-effective selective absorber for solar tower application
- 2.29. K. Buchkov, A. Galluzzi, B. Blagoev, A. Paskaleva, P. Terziyska, T. Stanchev, V. Mehandzhiev, P. Tzvetkov, D. Kovacheva, I. Avramova, E. Nazarova, M. Polichetti, Magneto-optical characterization of ZnO / Transition Metal Oxides nanolaminates obtained via Atomic Layer Deposition
- 2.30. Ch. Angelov, N. Tyutyundzhiev, T. Arsov, St. Georgiev, Environmental radiation monitoring at BEO Moussala
- 2.31. S. Georgiev, V. Donchev, M. Milanova, Calculation of the bandgap of dilute nitride GaAsSbN alloys