

**BULGARIAN ACADEMY OF SCIENCES
GEORGI NADJAKOV INSTITUTE OF SOLID STATE PHYSICS**

20th INTERNATIONAL SCHOOL ON CONDENSED MATTER PHYSICS
“Physics and Applications of Advanced and Multifunctional Materials”
September 3rd – 7th, 2018 – Varna, Bulgaria

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P R O G R A M M E

September 2nd (Sunday)

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

September 3rd (Monday)

09:00-09:20 Opening Ceremony
09:20-09:30 Honorary Chairman of event A.G. PETROV, “ISCMP: Twenty
Issues of History”

09:30-11:00 **Chair: H. Chamati**
09:30-10:15 P. Ch. IVANOV, “The new field of network physiology: how
statistical physics and nonlinear dynamics can help us understand
organ network interactions and build the human physiome”
Georgi Nadjakov Memorial Lecture
10:15-11:00 I. MIHAILESCU, “Laser soft transfer, construction and
reconstruction of thin layers of organic and inorganic materials for
top technologies by pulsed laser techniques”
Milko Borisov Memorial Lecture

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

11:30-12:50 **Chair: S. Reynolds**
11:30-12:10 E. GUZIEWICZ, “Mystery of electrical conduction of zinc oxide
– from heavily n-type to p-type material”
12:10-12:30 M. GARTNER, “ZnO films prepared by physical and chemical
methods for sensors and piezoelectric applications”
12:30-12:50 T. BABEVA, “Optical sensing of vapors and liquids using porous
Bragg reflectors”

12:55-16:00 Lunch break

16:00-17:20 **Chair: D. Dimova-Malinovska**
16:00-16:40 S. REYNOLDS, "Silicon thin-films: Functional materials for energy, healthcare and IT applications"
16:40-17:20 J.-P. KLEIDER, "Recent progress on the amorphous silicon / crystalline silicon interface"

17:20-18:00 **Chair: D. Nesheva**
17:20-18:00 Five minutes presentations of posters of young participants

September 4th (Tuesday)

09:10-10:30 **Chair: J. Genova**
09:10-09:50 Y. A. ERMAKOV, "Electric fields at the membrane interfaces: from lipid models to biomedical applications"
09:50-10:30 A. IGLIČ, "Water polarization and asymmetric finite size of ions in electric double layer"

10:30-11:00 Coffee break

11:00-13:00 **Chair: A. Iglič**
11:00-11:40 S. KRALJ, "Topological defects and membranes"
11:40-12:20 O. BATISHCHEV, "Lipid membrane elasticity and protein-lipid interactions"
12:20-12:40 V. SOKOLOV, "The kinetics of binding of protons with bilayer lipid membrane"
12:40-13:00 R. MOLOTKOVSKY, "Adsorption of polylysines at the surface of lipid membranes: Theoretical analysis of electrokinetic data"

13:00-16:00 Lunch break

16:00-18:00 **Chair: Y. A. Ermakov**
16:00-16:40 B. RIZZUTI, "Disordered proteins as intrinsically multifunctional targets"
16:40-17:20 S. AKIMOV, "Raft boundary structure determines line activity and self-organisation of membrane inclusions into symmetric structures"
17:20-17:40 D. KHOMICH, "Phase transition of DMPS monolayers studied by molecular dynamics and X-ray reflectometry"
17:40-18:00 I. JIMÉNEZ-MUNGUÍA, "In vitro study of porphyrins as candidate photosensitizers in photodynamic therapy against cancer"

18:00-19:00 **First poster session**

September 5th (Wednesday)

09:10-10:30 **Chair: M. Sčepanovič**
09:10-09:50 P. MONTGOMERY, "High resolution surface metrology using microsphere assisted interference microscopy"

09:50-10:30	P. PETRIK, "Monitoring of solid-liquid interfaces using ellipsometry"
10:30-11:00	Coffee break
11:00-13:00	Chair: P. Montgomery
11:00-11:40	M. ŠČEPANOVIČ, "Temperature-dependent Raman study of nanostructured and multifunctional materials"
11:40-12:00	V. DONCHEV, "Surface photovoltage study of GaInAsNSb layers for photovoltaic applications"
12:00-12:20	H. STROESCU, "Preparation and characterization of TiO ₂ thin films for harvesting applications and optoelectronic devices"
12:20-12:40	R. GEORGIEV, "Mesoporous Ta ₂ O ₅ thin films as an active medium for pollution monitoring of air and water"
12:40-13:00	K. LOVCHINOV "Influence of deposition temperature on the structural and optical properties of electrochemically nanostructured ZnO films"
13:00-16:00	Lunch break
16:00-18:00	Chair: P. Petrik
16:00-16:40	F. BALESTRA, "NanoCMOS and Small Slope Switches for the end of the Roadmap"
16:40-17:20	PH. VANDERBEMDEN, "Type-II superconductors used as magnetic shields: distinguishing the effects related to geometry from those related to physics"
17:20-17:40	J. ČWIK, "Magnetic properties and magnetocaloric effect in low temperature ordered Tb _{1-x} Dy _x Ni ₂ intermetallic compounds"
17:40-18:00	D. GAJDA, "High field pinning centers in NbTi wires and MgB ₂ wires"
18:00-19:00	Second poster session

September 6th (Thursday)

09:10-10:30	Chair: Ts. Babeva
09:10-09:50	D. DIMOVA-MALINOVSKA, "Nanostructured ZnO films for application in gas sensors"
09:50-10:10	K. BUCHKOV, "Inter-granular effects at high magnetic fields of cuprate and iron chalcogenide superconducting materials"
10:10-10:30	S. KOLEV, "Semiconducting Graphene"
10:30-11:00	Coffee break
11:00-13:20	Chair: V. Donchev
11:00-11:40	B. SARUHAN-BRINGS, "Memristor type gas sensors for high sensitivity sensing at low temperatures"
11:40-12:20	S. BANERJEE, "Corralling Electrons in Vanadium Oxides: Implications for Neuromorphic Computing and Electrochemical Energy Storage"

12:20-13:00	S. BARANOVSKII, "Theoretical description of charge transport in disordered solids: to simulate or to think?"
13:00-13:20	L. UDACHAN, "Impact of substrate temperature on grain boundary reflection in chromium nanofilms"
13:20-16:00	Lunch break
16:00-17:20	Chair: A. G. Petrov
16:00-16:40	M. MICHAILOV, "Atomic scale design, structure and stability of quantum nanowires on epitaxial interfaces"
16:40-17:20	V. ČELEBONVIČ, "Theoretically choosing multifunctional materials"
17:20-17:40	Coffee break
17:40-19:00	Chair: N. Ivanov
17:40-18:00	J. RICHTER, "Frustrated quantum magnetism: The flat-band scenario"
18:00-18:20	L. SHIVA, "A study on nucleation, growth and grain boundary reflection in thin tin nanofilms"
18:20-18:40	G. LEWIŃSKA, "D-D-A ternary organic solar cells"
18:40-19:00	S. ŞEN, "Phthalimide derivative spun films for organic vapour sensing"
20:00	Farewell Dinner

September 7th (Friday)

09:10-10:30	Chair: B. Rizzuti
09:10-09:50	M. FABIAN, "Bioactive glasses: structure characteristics and bone regeneration application"
09:50-10:30	Z. USATENKO, "Ring polymer chains in a slit geometry with mixed boundary conditions"
10:30-11:00	Coffee break
11:00-12:20	Chair: Z. Usatenko
11:00-11:40	A. BUKA, "Topological Defects in Liquid Crystals"
11:40-12:00	G. IVANOV, "Langmuir-Blodgett films from fluorescently labelled phospholipids deposited on surface acoustic wave devices and surface plasmon resonance substrates"
12:00-12:20	H. SOLUNOV, "On measuring the characteristic length of the cooperative molecular dynamic in glass-forming liquids"
12:20-12:40	Closing Ceremony
14:00	Social event/Visit of a historical place in the region, organized with the support of Varna Municipality

POSTER PRESENTATIONS

1. FIRST POSTER SESSION, September 4th (Tuesday)

- 1.1. V. Tashkin, V. Vishnyakova, A. Shcherbakov, H. Apell, V. Sokolov, Electrogenic transport of Na⁺, K⁺ and H⁺ ions in the cytoplasmic access channel of Na,K,ATP-ase studied by admittance measurements in model system.
- 1.2. K. Hristova-Panusheva, M. Keremidarska-Markova, T. Andreeva, G. Speranza, D. Wang, M. Georgieva, G. Miloshev, N. Krasteva, Dose-dependent genotoxicity of ammonia-modified graphene oxide particles in lung cancer cells
- 1.3. C. Özkaya, R. Çapan, F. Yükrük, M. Erdoğan, A study of room temperature vapor sensing properties using perylenediimide thin film
- 1.4. Z. Özbek, F. Davis, R. Çapan, Electrical measurements of a Calix[4]acid/amine alternate layer Langmuir-Blodgett thin film
- 1.5. Y. Acikbas, C. Ozkaya, S. Bozkurt, G. Tetik, R. Capan, M. Erdogan, α -naphthol based monomer Langmuir-Blodgett thin films for vapor sensing applications
- 1.6. K. Zhelyazkova, B. Katranchev and M. Petrov, Surface plasmon resonance assisted with bilayer phospholipid membrane
- 1.7. J. Genova, I. Bivas, M. Foslarič, A. Iglič and S. Penič, Influence of the stretching elasticity modulus on the thermal shape fluctuations of nearly spherical vesicles
- 1.8. Z. Slavkova, H. Chamati, J. Genova, Influence of gold nanoparticles on the elastic properties and phase behaviour of model lipid systems
- 1.9. D. Mitkova, G. Staneva, O.V. Batishchev and V. Vitkova, Bending elasticity of phosphatidylcholine membranes containing archaeal lipids
- 1.10. Y. Volkov, A. Tikhonov, B. Roshchin, V. Asadchikov, A. Nesterenko, D. Khomich, Y. Ermakov, Structural parameters of DMPS lipid monolayer during liquid/gel phase transition: X-ray reflectometry analysis
- 1.11. J. Halun, Z. Usatenko, Monomer density profiles for phantom ideal ring polymer chains in confined geometries
- 1.12. S. Şen, R. Çapan, Z. Özbek, M. E. Özel, G. A. Stanciu, F. Davis, CBAMINE LB films and the vapour detection of those against volatile organic compounds
- 1.13. S. Harkai, S. Kralj, Reconfigurable networks of nematic topological defects
- 1.14. G. Hadjichristov, Y. Marinov, Tz. Ivanov, H. Koduru, N. Scaramuzza, Electroanalytical survey of charge trapping in NaIO₄:(PEO/PVP) ion-conducting polymer electrolyte
- 1.15. K. Danel, A. Wisła-Świder, T. Lemek, Benzyne based aryl cycloaddition and indenoannulation from a common starter
- 1.16. I. Bodurov, A. Viraneva and T. Yovcheva, Electret and dielectric properties of lyophilized polymer films
- 1.17. V. Velev, S. Salim, N. Arhangelova, Calorimetric studies on tensile stress-induced crystallization of amorphous poly (ethylene terephthalate) filaments
- 1.18. P. Kuterba, Z. Usatenko, Ring polymer chains with Dirichlet-Neumann boundary conditions in confined geometries
- 1.19. N. Ivanov and J. Schnack, Phase diagrams of Heisenberg chains with three-spin exchange couplings and different composite spins in the unit cell
- 1.20. M. Georgiev and H. Chamati, Model parameters and the spin trimer system A₃Cu₃(PO₄)₄ (A = Ca, Sr, Pb)
- 1.21. S. Varbev, R. S. Kamburova and M. T. Primatarowa, Interaction of solitons with a qubit in an anisotropic Heisenberg spin chain

- 1.22. O. D'Huys, J. Rodríguez-Laguna, M. Jiménez, E. Korutcheva and W. Kinzel, Synchronization in fluctuating networks with delay interactions
- 1.23. E. Pisanova, Entropy and specific heat of a critical quantum system with long-range interaction
- 1.24. S. Varbev, R. Kamburova and M. Primatarowa, Soliton-impurity interaction in two coupled ferromagnetic chains
- 1.25. H. Hristova, S. Ognianski, V. Steflekova, E. Dimova, Quantum-optical analogies
- 1.26. M. Milev, St. Minkova, Kr. Nikolova, Ir. Ivanova, N. Hristova-Akumuva, V. Hadjimitova, M. Kakalova, Comparative statistical analysis of Bulgarian red wines on the base of optical and chemical characteristics
- 1.27. R. Gergova, M. Sendova-Vassileva, G. Popkirov, G. Grancharov, V. Gancheva, Study of aged polymer bulk heterojunction solar cells by impedance spectroscopy
- 1.28. I. Angelova, C. Chiou, C. Fidanova, V. Marinova, S. Lin, D. Petrova, B. Blagoev and D. Dimitrov, Al-doped ZnO for flexible polymer dispersed liquid crystal devices
- 1.29. K. Temelkov, Y. Fedchenko, S. Slaveeva, T. Chernogorova, Theoretical study on some plasma parameters and thermophysical properties of gas-discharge plasma in various gas mixtures using new methods
- 1.30. G. Hadjichristov, Y. Marinov, A. Petrov, H. Koduru and N. Scaramuzza, Polymer(PEO)-liquid crystal (LC E8) composites: The effect from the LC inclusion
- 1.31. H. Tonchev, A. Donkov, H. Chamati, Exact results for the energy spectrum of the Jaynes-Cummings model interacting with a spin chain

2. SECOND POSTER SESSION, September 5th (Wednesday)

- 2.1. E. Manolov, N. Nedev, V. Dzhurkov, D. Nesheva, J. Paz-Delgadillo, M. Curiel-Alvarez, B. Valdez-Salas, Investigation of resistive switching in SiO₂ layers with Si nanocrystals
- 2.2. D. Nesheva, Ts. Babeva, M. Vasileva, B. Valdes-Salas, V. Dzhurkov, M. U. Grujić-Brojčin, M. J. Šćepanović, O. Perez, N. Nedev, M. Curiel, Ethanol adsorption in TiO₂ nanotubes anodically grown on Ti₆Al₄V alloy substrates
- 2.3. S. Kansara, S. Gupta, Y. Sonvane, Two dimensional transition metals nanosheet for nitric oxide: A DFT study
- 2.4. S. Simeonov, A. Szekeres, M. Covei, D. Spassov, L. Predoana, H. Stroescu, M. Gartner, M. Zaharescu, Charge transport mechanism in Vanadium doped TiO₂ sol-gel films
- 2.5. S. Boyadjiev, S. Mihaiu, I. Atkinson, V. Georgieva, L. Vergov, P. Rafailov, I. Szilágyi, Sol-gel grown bare, Ni- and Li/Ni-doped ZnO thin films for gas sensor applications
- 2.6. V. Dzhurkov, Z. Levi, D. Nesheva, Room temperature sensitivity of ZnSe nanolayers to ethanol vapours
- 2.7. K. Lazarova, S. Boycheva, M. Vasileva, D. Zgureva, B. Georgieva and T. Babeva, Zeolites from fly ash embedded in thin niobium oxide matrix for optical sensing applications
- 2.8. D. Spassov, A. Paskaleva, T. A. Krajewski, UE. Guziewicz, T. Ivanov, Leakage currents in Al₂O₃/HfO₂ multilayer high-*k* stacks and their modification by post-deposition annealing steps
- 2.9. M. Beshkova, R. Yakimova, Two-dimensional materials with focus on AlN-possibility of experimental growth and characterization by ellipsometry

- 2.10. T. Hristova-Vasileva, I. Bineva, R. Todorov, A. Dinescu, C. Romanitan, In-depth evolution of tellurium films deposited by frequency assisted thermal evaporation in vacuum (FATEV)
- 2.11. M. Ganchev, A. Katerski, J. S. Eensalu, R. Gergova, M. Sendova – Vassileva, G. Popkirov, P. Vitanov, Influence of deposition parameters on opto-electronic properties of spin – coated SnO₂ thin films
- 2.12. M. Sendova-Vassileva, R. Gergova, Hr. Dikov, G. Popkirov, P. Vitanov, G. Grancharov, V. Gancheva, Alternative WO₃ hole transport layer for organic solar cells
- 2.13. A. Stoyanova-Ivanova, I. Ilievska, V. Petrunov, S. Cherneva, R. Iankov, V. Mikli, In-vivo study on titanium–niobium orthodontic archwires
- 2.14. J. Shah, M. Ranjan, S. K. Gupta, Y. Sonvane, Temperature-dependent thermal conductivity and viscosity of synthesized α -Alumina nanofluids
- 2.15. D. Nicheva, I. N. Mihailescu, G. Stan, I. Pasuk, G. Popescu-Pelin, C. Ristoscu, P. Petkov, T. Petkova, Structure investigation of thin films from Zn-cobaltite prepared by pulsed laser deposition
- 2.16. K. Garasz, M. Kocik, Experimental investigations on ultrashort laser ablation for micro and nanomachining of materials
- 2.17. I. Bliznakova, A. Daskalova, A. Zhelyazkova, L. Angelova, A. Trifonov, I. Bucharov, Femtosecond Laser surface of thin chitosan/ hydroxyapatite layers for biomedical applications
- 2.18. T. Yovcheva, S. Rusev, B. Pilicheva, A. Marinova, A. Viraneva, I. Bodurov, G. Exner, S. Sotirov, I. Vlaeva, Y. Uzunova, M. Marudova, Crosslinked chitosan/casein polyelectrolyte multilayers for drug delivery
- 2.19. V. Stefleikova, D. Zhechev, Light induced nonselective effects in the negative glow
- 2.20. Y. Marinov, G. Hadjichristov, P. Rafailov, S. Lin, V. Marinova, A. Petrov, Optical, electro-optical, electrical and dielectric characterization of nematic liquid crystal (E7) layers doped with graphene and graphene oxide nanoparticles for electro-optics
- 2.21. G. Hadjichristov, T. Vlahov, Y. Marinov, Impedance and dielectric spectroscopy study of graphene-doped liquid crystal E7
- 2.22. H. Nichev, N. Tyutyundzhiev, M. Petrov, K. Lovchinov, P. Petrov, Development of low-cost technology to obtain supercapacitors based on activated carbon
- 2.23. A. Vasev, P. Lilov, Y. Marinov, A. Stoyanova, D. Karashanova, G. Ivanova, D. Kovacheva, V. Mikli, A. Stoyanova-Ivanova, Electrochemical behavior of BSCCO cuprate ceramics in alkaline solution
- 2.24. N. Tyutyundzhiev, K. Lovchinov, M. Petrov, H. Nichev, P. Petrov, C. Angelov, Graphene/polyaniline flexible supercapacitors using non-metallic electrodes
- 2.25. R. Gegova, A. Bachvarova-Nedelcheva, R. Iordanova, Y. Dimitriev, Sol-gel synthesis and structural characterization of compositions in the system TiO₂-TeO₂-SeO₂
- 2.26. G. Dyankov, K. Zhelyazkova, M. Petrov, B. Katranchev, H. Naradikian, Y. Marinov, T. Dimitrova, Surface plasmon for exploration the temperature dependence of hybrid cholesteric liquid crystal's pitch
- 2.27. İ. Çapan, M. Bayrakci, M. Erdogan, M. Ozmen, Fabrication of thin films of phosphonated calix arene bearing crown ether and their gas sensing properties
- 2.28. S. Reynolds, A. Houghton and D. Keeble, Electronic transport in methylammonium lead halide perovskite single crystals studied by transient photoconductivity
- 2.29. E. Iordanova, G. Yankov, V. Mihailov and N. Nedyalkov, LIBS analyses on glass materials doped with noble metal nanoparticles.