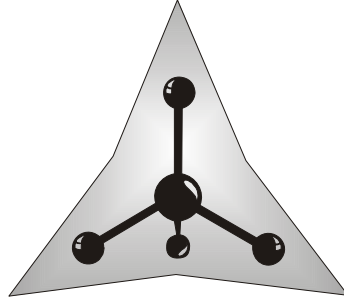


**National Academy of Sciences of Ukraine  
Ministry of Education and Science of Ukraine  
Scientific Council on the problem "Physics of Semiconductors and  
dielectrics" NASU Ukraine  
Ukrainian Physical Society  
Academy of Sciences of High School of Ukraine  
Institute of Physics of NASU  
Institute of Semiconductor Physics of NASU  
Scientific-Research Company "Carat" (Lviv)  
Drohobych Ivan Franko State Pedagogical University**



**PROGRAM  
X INTERNATIONAL CONFERENCE ON  
TOPICAL PROBLEMS OF  
SEMICONDUCTOR PHYSICS**



**Truskavets, UKRAINE  
June 26 – 29, 2018**

# PROBLEMS

*for discussion*

- 1. Quantum-size confinement phenomena.*
- 2. Effects of strong correlation in the systems with electronic and ionic conductivity.*
- 3. Electronic transport, optic, photoelectric and magnetic properties of semiconductor crystals.*
- 4. Impurity and impurity-structural complexes of technological and radiation origin.*
- 5. Structural disordering factor manifestations of basic semiconductor properties. Semiconductor oxide ceramics.*
- 6. Semiconductor metrology, novel techniques and methods.*
- 7. Cluster phase: formation, properties and modeling.*

## ORGANIZATORS

National Academy of Sciences of  
Ukraine  
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of Ukraine  
Scientific Council on the problem  
"Physics of Semiconductors and  
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Institute of Semiconductor Physics  
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Scientific-Research Company  
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**Co-chairman:** Vasyl Boichuk, Professor

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**26 June, Tuesday**

**CONFERENCE OPENING**  
**(conference hall sanatorium “Dnipro-Beskyd”)**

**Opening Greetings:**

**10.00-10.20** *N. Skotna, M. Strikha, I. Blonskyi, V. Litovchenko, V. Boichuk*

**PLENARY SESSION**

**Chairmans session: V. Litovchenko, I. Blonskyi**

**10.20-10.50** **EFFECT OF THE NEGATIVE DIFFERENTIAL CONDUCTIVITY IN 2D SEMICONDUCTOR MONOLAYERES: THEORETICAL MODEL**

**V.G. Litovchenko, A.I.Kurchak, M.V. Strikha**

**10.50-11.20** **SPATIO-TEMPORAL TRANSFORMATION OF INFRA-RED FEMTOSECOND LASER PULSES IN CRYSTAL SILICON**

**Ivan Blonskyi, Viktor Kadan, Svitlana Pavlova, Ihor Pavlov, Andriy Rybak, Laurent Calvez, Oleh Shpotyuk**

**11.20-11.50** **Coffee Break**

**11.50-12.20** **EFFECT OF POLARIZATION TRAPS, DONOR AND ACCEPTOR IMPURITIES ON THE INTRABAND AND INTERBAND LIGHT ABSORPTION OF QUANTUM DOTS**

**Boichuk V.I., Leshko R.Ya., Karpyn D.S., Ivanchyshyn I.B., Toma I.P.**

**12.20-12.50** **TOPOLOGICAL INSULATORS BASED ON THE SEMIMETAL HgCdTe ALLOYS**

**P. Śliż, M. Marchewka, D. Żak, J. Polit, E.M. Sheregii**

**12.50-13.20** **THE EFFECT OF UV Nd:YAG LASER RADIATION ON THE OPTICAL AND ELECTRICAL PROPERTIES OF ZnO CRYSTAL: INITIATED PHASE TRANSITION**

**A. Medvid’, P. Onufrijevs**

**13.20-15.00** **Lunch**

**Chairmans session: A. Kovalenko, V. Shenderovskyi**

**15.00-15.20** **FORMATION OF NANOCCLUSERS ON THE ADSORBED SURFACE UNDER THE ACTION OF COMPREHENSIVE PRESSURE AND ELECTRIC FIELD**

**R.M. Peleshchak, O.V. Kuzyk, O.O. Dan’kiv, M.V. Bui**

**15.20-15.40** **SYNTHESIS OF NANOCOMPOSITE POLYMER FILMS WITH THE EMBEDDED CIS NANOCRYSTALS AND THEIR OPTICAL PROPERTIES**

**V. Tokarev, O. Shevchuk, H. Ilchuk, N. Bukartyk, R. Petrus, S. Tokarev, D. Korbutyak, S.Budzulyak, O.Kapush, V.Ermarov, S.Kalytchuk, N.Vakhnyak**

- 15.40-16.00 **PARTICULARITIES OF ZnO:Mn NANOCRYSTALS DOPING AT THEIR SYNTHESIS BY AEROSOL SPRAY PYROLYSIS METHOD**  
A.V. Kovalenko, V.Yu. Vorovsky, M.F. Bulaniy, O.V. Khmelenko
- 16.00-16.30 **Coffee Break**
- 17.00-17.20 **LOW FREQUENCY RAMAN SPECTRA OF  $As_xS_{100-x}$  GLASSES AND LOW FREQUENCY QUASI-LOCALIZED VIBRATIONS OF SOFT AND RIGID  $As_N S_M$  NANOCCLUSERS DEPENDING ON NUMBER OF FIXED POINTS**  
R. Holomb, V.Mitsa, L.Himics, M.Veres
- 17.20-17.40 **SYNERGISTIC EFFECTS IN IRRADIATED SEMICONDUCTOR CRYSTALS. RADIATION STABILITY CONSTANTS**  
M. Zavada, O. Konoreva, P. Lytovchenko, I. Petrenko, M. Pinkovska, O. Radkevych, V. Tartachnyk, V. Shlapatska
- 17.40-18.00 **ION-INDUCED PROCESSES IN POLYMERS AND COMPOSITE MATERIALS: POSITRON ANNIHILATION SPECTROSCOPY STUDY**  
T. Kavetsky, K. Iida, Y. Nagashima, M.O. Liedke, M. Butterling, A. Wagner, R. Krause-Rehberg, O. Šauša, T. Petkova, V. Boev, A.L. Stepanov, L. Meshi, D. Fuks, A. Kiv
- 18.00-18.20 **THE CONTRIBUTION OF UKRAINIAN SCIENTISTS INTO THE CATHODE-RAY PHYSICS FORMATION**  
V.A. Shenderovskiy
- 18.20-19.00 **POSTER SESSION**

#### POSTER MATERIALS

1. **THE JOINED EFFECT OF ELECTRIC AND MAGNETIC FIELD ON THE OPTICAL PROPERTIES OF NANOSTRUCTURE CdS/HgS/CdS/HgS/CdS**  
V.A. Holovatsky, M.Ya. Yakhnevych, N. Ya. Yakhnevych
2. **EFFECT OF ELECTRIC FIELD ON OPTICAL PROPERTIES OF SEMICONDUCTOR QUANTUM RINGS IN INFRARED REGION OF THE SPECTRUM**  
O.M. Makhanets, V.I. Gutsul
3. **EFFECT OF SWITCHING IN THE CONDUCTIVITY OF InGaAs/GaAs HETEROSTRUCTURES WITH TUNNEL-COUPLED QUANTUM WELLS**  
P.A. Belevskii, M.M. Vinoslavskii, V.M. Poroshin
4. **ELECTRONIC PROPERTIES OF SURFACE VACANCIES IN CDS NANOCRYSTALS**  
I.M. Kupchak, N.F. Serpak, O.A. Kapush, D.V. Korbutyak

5. INVESTIGATION OF CONDUCTIVITY AND OPTICAL TRANSMISSION PROCESSES IN CdTe:I SINGLE CRYSTALS GROWN FROM VAPOUR PHASE  
V.D. Popovych, O.A.Parfenjuk, Z.F. Tsybrii (Ivasiv)
6. A METHOD OF MINORITY CHARGE CARRIERS BASIC PARAMETERS DETERMINATION IN SOLID MATTER  
Y.O. Uhryn, V.B. Brytan, I. Kosivchak, M. Govda
7. SYNTHESIS OF DOPED NCs CdTe  
O.A. Kapush, D.V. Korbutyak, S.I. Budzulyak, N.D. Vakhniak
8. TWO ELECTRONIC MOLECULA CONTAINING THREE SPHEREID QUANTUM DOTS  
Boichuk V.I., Holskyj V.B., Leshko R.Ya.
9. BACGROUND IMPURITIES AND DELTA-DOPED QWs  
O.Fomina, V.Tulupenko, R. Demediuk, V. Akimov, C.A. Duque, A.L.Morales, and D. Sushchenko
10. EFFECT OF POLARIZATION PHONONS ON ELECTRON, HOLE AND EXCITON STATES IN SPHERICAL QUANTUM DOTS OF CUBIC LATTICE STRUCTURE  
I. S. Shevchuk

27 June, Wednesday

PLENARY SESSION

Chairmans session: V. Babich, Yu. Vaksman

- 10.00-10.30 **THERMODONORS IN SILICON CRYSTALS: PRACTICAL ASPECTS OF  $p-n$  JUNCTION CREATION IN Cz-Si MATERIAL USING BURIED  $n$ -TYPE LAYERS OF THE CONDUCTIVITY DEFINED BY SHALLOW THERMODONORS**  
**V. Babich, O. Dubikovskiy, V. Popov, B. Romanyuk, S. Sapon, T.Sabov, O. Lyubchenko**
- 10.30-11.00 **PROPERTIES OF ELECTRON QUASI-STATIONARY STATES IN DOUBLE-BARRIER NANOSTRUCTURE WITHIN THE MODEL OF POSITION DEPENDENT EFFECTIVE MASS**  
**J.O. Seti, M.V. Tkach, O.M. Voitsekhivska**
- 11.00-11.30 **OBTAINING AND OPTICAL PROPERTIES OF ZnS, ZnS:Fe NANOCRYSTALS**  
**Yu.F.Vaksman, Yu.A.Nitsuk**
- 11.30-12.00 **Coffee Break**
- 12.00-12.30 **FEATURES OF OPTICAL PROPERTIES OF ZnSe <Al> SUBSTRATES WITH A MODIFIED SURFACE**  
**Makhniy V.P., Berezovskiy M.M., Vakhnyak N.D., Litvin P.M., Kinzerska O.V., Senko I.M.**
- 12.30-13.00 **RADIATION-INDUCED CHANGES IN ELECTROMECHANICAL AND OPTICAL CHARACTERISTICS OF SILICON STRUCTURES**  
**B.V. Pavlyk, D.P. Slobodzyan, R.M. Lys, M.O. Kushlyk, R.I. Didyk, J.A. Shykorjak**
- 13.00-13.30 **THE OPTICAL PHONONS MANIFESTATIONS IN DYNAMICS OF THE OPTICAL ABSORPTION SPECTRA OF THE FLAT HETEROSTRUCTURES  $Al_xGa_{1-x}N/GaN/Al_xGa_{1-x}N$  WITH QUANTUM WELLS OF DIFFERENT WIDTH**  
**V.M. Kramar, D.V. Kondryuk, A.V. Derevyanchuk**
- 13.30-15.00 **Lunch**
- Chairmans session: O. Shpotyuk, J. Seti
- 15.00-15.20 **MAGNETO-OPTICAL STUDIES OF CdTe / CdMnTe DOUBLE QUANTUM WELLS**  
**O.V.Terletsky, V.Yu. Ivanov, L.Owczarczyk, S.M.Ryabchenko,**



- V.I.Sugakov, G.V. Vertsimakha, G. Karczewski
- 15.20-15.40 **BIMETALLIC NANOCATALYSTS PtCu and PtNi FOR FUEL CELLS**  
Chernikova O.M., Ogorodnik Y.V.
- 15.40-16.00 **PHOTOVOLTAIC PROPERTIES OF NANOCOMPOSITE IONATRON STRUCTURES InSe <RbNO<sub>3</sub>>**  
I.G. Tkachuk, V.M. Vodopianov, V.I. Ivanov, Z.D. Kovalyuk , V.V. Netyaga
- 16.00-16.30 **Coffee Break**
- 17.00-17.20 **STRUCTURE AND PROPERTIES OF Ge ADSORPTION COMPLEXES ON THE Si(001) FACE**  
O.I. Tkachuk, M.I. Terebinska, Ya.S. Krivoruchko, V.V. Lobanov
- 17.20-17.40 **As<sub>2</sub>S<sub>3</sub> DOPED WITH Mn OR Ag: RAMAN AND XRD STUDY**  
Revutska L.O., Shportko K.V., A.V. Stronski, Popovych M.V., A.Yo. Gudymenko, O.P. Paiuk, Ts.A. Kryskov
- 17.40-18.00 **CdS - BASED SEMIMAGNETIC SEMICONDUCTOR NANOPARTICLES AND THEIR BIOCOMPLEX WITH PROTEIN FOR BIOIMAGING APPLICATION**  
I. D. Stolyarchuk, R. Wojnarowska-Nowak, J. Polit, S. Nowak, M. Romerowicz-Misielak, H. M. Klepach, E. M. Sheregii
- 18.00-19.00 **POSTER SESSION**
- 19.00 **BUSINESS MEAL**

#### POSTER MATERIALS

11. **ELECTRONIC STRUCTURES OF Si<sub>1-x</sub>Sn<sub>x</sub> SEMICONDUCTORS: FIRST PRINCIPLES AND MODEL PSEUDOPOTENTIAL CALCULATIONS**  
P.M. Yakibchuk, O.V. Bovgyra, I.V. Kutsa
12. **GENERATION OF ELECTRONIC EXCITATIONS IN SEMICONDUCTORS UNDER THE ACTION OF CHEMICAL REACTION ON THE SURFACE**  
V.P. Grankin, D.V. Grankin
13. **EFFECT OF SYMMETRY OF SMALL STOICHIOMETRIC ZIRCONIA PARTICLES ON THEIR SPECTRAL CHARACTERISTICS**  
O.V. Smirnova, A.G. Grebenyuk, V.V. Lobanov
14. **FEATURES OF MAGNETIC SUSCEPTIBILITY Si<sub>0,97</sub>Ge<sub>0,03</sub> WHISKERS MODIFIED OF HIGH-ENERGY IRRADIATION**  
Yu.V. Pavlovskyy, P.G. Lytovchenko, A.V. Lytovchenko

15. THERMO-INDUCED CHANGES IN THE MECHANICAL CHARACTERISTICS OF MONOCRYSTALLINE SILICON  
Yu.V. Pavlovskyy
16. PECULIARITIES OF SHORT-WAVE RADIATION OF HEXAGONAL  $\alpha$ -ZnSe AND  $\alpha$ -ZnSe<sub>x</sub>S<sub>1-x</sub>  
M.M. Slyotov, O.M. Slyotov
17. FIRST-PRINCIPLES STUDY OF THE CONDUCTIVITY OF In<sub>x</sub>Tl<sub>1-x</sub>I SOLID SOLUTIONS OF SUBSTITUTION  
Kashuba A.I., Franiv A.V., Solovyov V.V.
18. TEMPERATURE DEPENDENCES OF VOLTAGE-TO-CURRENT CHARACTERISTICS OF Tl<sub>4</sub>HgI<sub>6</sub> AND Tl<sub>4</sub>CdI<sub>6</sub> CRYSTALS  
Solovyov M.V., Kashuba A.I., Franiv V.A.
19. COMPOSITE THERMOELECTRIC MATERIALS BASED ON LEAD AND CADMIUM TELLURIDES  
V.V. Prokopiv, I.V. Horichok, Y.V. Ogorodnik, O.M. Matkivsky, L.V. Turovska
20. OPTICAL PROPERTIES OF PMMA NANOCOMPOSITES IMPLANTED BY LIGHT AND HEAVY IONS  
T.S. Kavetsky, M. Trzciński, M.M. Kravtsiv, K.V. Zubrytska, O.R. Mushynska, A.L. Stepanov
21. FABRICATION OF PHOTONIC CRYSTAL BY ION IMPLANTATION: POSSIBILITY TO USE A CHALCOGENIDE FILM SUBSTRATE  
T.S. Kavetsky, K.V. Zubrytska, A.V. Stronski, L.I. Pan'kiv, P. Petkov, V.I. Nuzhdin, V.F. Valeev, A.M. Rogov, Y.N. Osin, A.S. Morozova, A.L. Stepanov, J. Ruan, H. Tao, X. Zhao

**28 June, Thursday**

**PLENARY SESSION**

**Chairmans session: A. Medvid', V. Mitsa**

**10.00-10.30 RADIATION-INDUCED CREATION OF ATOMIC CLUSTERS IN POLYATOMIC CRYSTALS**

**A. E. Kiv, N. A. Mykytenko, Yu. V. Bondaruk, I. I. Donchev**

**10.30-11.00 LOW FREQUENCY NOISE IN POLYCRYSTALLINE ZnO THIN FILMS**

**Virt I., Didovska O. , Bester M.**

**11.00-11.30 CHARACTERIZATION OF PbTe AND PbSe THIN FILMS PREPARED USING PULSED LASER DEPOSITION METHOD**

**Tur Yu, Virt I.S.**

**11.30-12.00**

**Coffee Break**

**12.00-12.30 ELECTRON SPECTRUM ON THE DYNAMICALLY DEFORMED ADSORBED SURFACE OF A SEMICONDUCTOR WITH A ZINC BLENDE STRUCTURE**

**M.Ya. Seneta, R.M. Peleshchak, Yu.M. Hal', Ya.M. Voronyak, M.G. Stan'ko**

**12.30-13.00 ELECTRICAL, STRUCTURAL AND PHOTOELECTRIC FEATURES OF THIN ZnO:Al FILMS ON Si WAFERS**

**V.P. Melnik, B.M. Romanyuk, V.P. Kladko, V.G. Popov, O.Yo. Gudymenko, O.I. Liubchenko, T.M. Saboy, O.S. Oberemok, O.V. Dubikovskiy, Ju.V. Gomeniuk**

**13.00-13.30 STRUCTURE AND PHYSICO-CHEMICAL PROPERTIES OF GRAPHENE-LIKE NANODOTS**

**Karpenko O.S., Demianenko E.M., Lobanov V.V., Kartel M.T.**

**13.30-15.00**

**Lunch**

**15.00-20.00**

**Excursion to the Carpathian mountains**

**29 June, Friday**

**PLENARY SESSION**

**Chairmans session: B.Pavlyk, V. Makhniy**

- 10.00-10.30 INVESTIGATION OF THE RELAXATION CHARACTERISTICS OF EPOXY POLYMERS BY CALORIMETRIC METHOD**  
**M.I. Shut, T.G. Sichkar, L.K. Yanchevsky, O.S. Tulzhenkova, M.O. Rokytskyi**
- 10.30-11.00 ELECTRICAL CONDUCTIVITY AND HALL MOBILITY OF Bi<sub>2</sub>Se<sub>3</sub> THIN FILMS WITH DIFFERENT THICKNESSES**  
**S.I. Menshikova, E.I. Rogacheva**
- 11.00-11.30 AMPEROMETRIC ENZYME BIOSENSORS BASED ON NOVEL ORGANIC-INORGANIC AND PHOTOCROSS-LINKED POLYMERS**  
**T. Kavetsky, O. Smutok, M. Gonchar, Y. Kukhazh, O. Šauša, H. Švajdlenková, T. Petkova, V. Boev, V. Ilcheva, S. Kasetaitė, J. Ostrauskaite**
- 11.30-12.00 Coffee Break**
- 12.00-12.30 INVESTIGATION OF EPR SPECTRA IN ZnS<sub>x</sub>Se<sub>1-x</sub> NANOCRYSTALS.**  
**A. V. Kovalenko, E. G. Plakhtiy, O. V. Khmelenko**
- 12.30-13.00 OPTICAL PROPERTIES OF THE ARRAYS DIFFERENT FORM QUANTUM DOTS**  
**V.I. Boichuk, I.V. Bilynskyi, R.I. Pazyuk**
- 13.00-13.30 ELECTRICAL CONDUCTIVITY OF NON-STOICHIOMETRIC NiO THIN FILMS**  
**H. P. Parkhomenko, P. D. Maryanchuk**
- 13.30-14.00 ON REARRANGMENT OF THE ENERGY SPECTRUM OF DELTA-DOPED QUANTUM WELLS IN THE THZ RANGE**  
**V.Tulupenko, R. Demediuk, V. Akimov, C. A. Duque, A.L.Morales, D. Sushchenko, and O.Fomina.**
- 14.00. CLOSING CONFERENCE**