

9th International Conference
NANOBIOPHYSICS: Fundamental and Applied Aspects
N B P - 2025

CONFERENCE PROGRAM

6 OCTOBER, MONDAY

10.00-10.15 OPENING OF THE CONFERENCE

Physical properties of biomolecular nanosystems

Chair Victor Karachevtsev

**10.15-10.45 BIOPHYSICS OF GFP PROTEIN – A MARKER COMMONLY
USED AS A FLUORESCENT LABEL PL6**
Krasowska J., Bzowska A., Breer K., **Wielgus-Kutrowska B.**

**10.45-11.05 MECHANICAL PROPERTIES OF THE MEMBRANE OF
CIRCULATING METASTATIC TUMOR CELLS AS A O10
DIAGNOSTIC MARKER**
Gnatyuk O.P., Olenchuk M.V., Romanenko S.V., Monastyrskyi G.P.,
Solyanik G.I., Kolesnik D.L., Dovbeshko G.I.

**11.05-11.25 CORE-SHELL Au@PEtOx-PBuOx COLLOIDS WITH TUNABLE
LCST TRANSITION FOR THERMALLY SWITCHABLE O8
OPTICAL APPLICATIONS**
Yeshchenko O., Daoud L., **Fedotov O.**, Khort P., Krupka O.

11.25-11.30 *General Conference Photo (online)*

11.30-11.40 *Technical break*

Physical properties of biomolecular nanosystems

Chair ***Victor Karachevtsev***

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|--------------------|---|------------|
| 11.40-12.10 | FROM UV TO IR: STRATEGIES FOR COMPLETE SOLAR ENERGY CAPTURE IN PHOTOSYNTHESIS
Freiberg A. | PL1 |
| 12.10-12.30 | INTRINSIC DISORDER OF THE bHLH-PAS FAMILY OF TRANSCRIPTION FACTORS
Kolonko-Adamska M., Greb-Markiewicz B. | O11 |
| 12.30-12.50 | FEATURES OF EXCITATION OF NUCLEIC ACIDS COMPONENT ON THE MATRIX SURFACE BY ELECTRON BEAM
Sukhoviya M.I., Shafranyosh M.I., Kovach V.V., Shafranyosh I.I. | O27 |

12.50-14.00 ***Time for Lunch***

Applied aspects of nanobiophysics

Chair ***Marina Kosevich***

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|--------------------|---|------------|
| 14.00-14.30 | COUNTERIONS IN DNA-NANOMATERIALS
Perepelytsya S.M. | PL4 |
| 14.30-14.50 | SYNERGISTIC THREAT TO THE NERVOUS SYSTEM FROM COMBINED EXPOSURE TO COPPER AND WOOD SMOKE PARTICULATE MATTER
Dovbeshko G.I., Krisanova N.V., Pozdnyakova N.G., Pastukhov A.O., Dudarenko M.V., Tarasenko A.S., Borysov A.A., Bezkravnyi O., Gnatyuk O., Tolochko A., Boiko V., Borisova T.O | O4 |
| 14.50-15.10 | ARTEMISININ: AN ANTIMALARIAL AGENT DISRUPTING NANOCRYSTAL HEMOZOIN FORMATION, WITH ANTITUMOR AND IMMUNE-MODULATING PROPERTIES
Skorokhod O., Valente E., Mandili G., Ulliers D., Schwarzer | O29 |
- 15.10-15.20** ***Technical break***
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|--------------------|---|------------|
| 15.20-15.40 | NANOBIOHYBRIDS OF 2D MoS₂ WITH ANTICANCER DRUGS: EXPERIMENTAL & THEORETICAL CHARACTERIZATION, APPLICATION PROSPECTS
Pashynska V.A., Kosevich M.V., Stepanian S.G., Kuzema P.O., Boryak O.A., Voloshin I.M., Karachevtsev V.A. | O24 |
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15.40-16.00	APPLICATION OF NIR-REDUCED GRAPHENE QUANTUM DOTS FOR BIOSENSING OF NEUROTRANSMITTERS/HORMONES Sharma P.	O28
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16.00-16.20	BIOLOGICAL AND MECHANICAL PROPERTIES OF THE COMPOSITES CONTAINING GRAPHENE FLAKES OBTAINED FROM MINERAL GRAPHITE Gluchowski P., Grabowska A., Bartczak N., Junka A., Kowalczyk J., Stręk W.	O9
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16.20-16.40	SURFACE AND INTERFACE EFFECTS IN THE ANTIBACTERIAL ACTIVITY OF NANO- AND MICROSCALE OXIDES OF ZINC AND GALLIUM Strzhemechny Y.M., Brannon J.H., Johnson D.A., McGillivray S.M., Wiglusz R.J., Watras A., Boiko V.V., Danchuk V.V.	O30
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16.40-18.00

Poster Session 1

**P1-
P15**

Moderator Marina Kosevich

7 OCTOBER, TUESDAY

Theoretical calculations and computer modeling of nanobiosystems

Chair ***Vlada Pashynska***

10.00-10.30	SARS-COV-2 EVOLUTION FROM 2021 TO 2025: GENERAL FACTS AND RESEARCH FINDINGS Khmil N.V., Shestopalova A.V.	PL4
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10.30-10.50	ACCURATE MACHINE LEARNING APPROACH TO PROTEIN-LIGAND DOCKING Voitsitskyi T., Koleiev I., Starosyla S., Yesylevskyy S.	O34
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10.50-11.10	STABILITY OF COMPLEXES OF Ag⁺ IONS WITH NITROGENOUS BASES OF THE DNA MOLECULE Osokin Y.S., Perepelytsya S.M.	O23
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11.10-11.30	FTIR SPECTROSCOPY BASED IDENTIFICATION OF SPECTRAL BIOMARKERS ASSOCIATES WITH BIOLOGICAL AGE USING MACHINE LEARNING Kot O., Kyrylenko R., Melnychenko M., Midlovets K., Makhnii T., Krasnenkov D.	O17
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11.30-11.40

Technical break

- 11.40-12.00** PARTIAL LEAST SQUARES ANALYSIS OF ATR-FTIR SPECTRA FOR INTRAOPERATIVE CHARACTERIZATION AND RAPID BIOCHEMICAL PROFILING OF BRAIN TUMORS **O12**
Gubareni Ie.V., Gnatiuk O.P., Shmeleva A.A., Malysheva T.A., Vaslovich V.V., Dovbeshko G.I.
- 12.00-12.20** A PHYSICALLY INTERPRETABLE NEURAL NETWORK MODEL FOR DETERMINING THE ENERGY OF BIOMOLECULES BASED ON THEIR STRUCTURE **O31**
Terets A.D., Nikolaienko T.Yu.
- 12.20-12.40** DFT STUDY OF TERNARY COMPLEXES OF MoS₂ WITH URACIL AND NOBLE METAL CLUSTERS: STRUCTURE, STABILITY AND SPECTRA **O26**
Stepanian S.G.

12.40-14.00

Time for Lunch

Biomolecules on nanoparticles and nanostructured surfaces

Chair *Stepan Stepanian*

- 14.00-14.30** ON POSSIBILITIES OF MINERAL MOS₂ PARTICIPATION IN PREBIOLOGICAL CHEMICAL EVOLUTION **PL2**
Kosevich M.V., Shelkovsky V.S., Boryak O.A., Pashynska V.A., Kuzema P.O., Stepanian S.G., Karachevtsev V.A.
- 14.30-14.50** FROM CHAOS TO THE FIRST STORED INFORMATION AND ORIGIN OF LIFE **O18**
Krasnokutski S.A.
- 14.50-15.10** PMMA:PVP BLENDED NANOFIBERS LOADED WITH ANTIBIOTIC LEVOFLOXACIN FOR ANTIBACTERIAL APPLICATION **O14**
Karachevtsev V.A., Plokhonichenko A.M., Trufanov O.V., Stepanian S.G.

15.10-15.20

Technical break

- 15.20-15.40** BSA-PERSISTENT NANOPARTICLES INTERACTION: LINKING OPTICAL PROPERTIES TO STRUCTURAL PROTEIN CHANGES **O3**
Boiko V.V., Fandzloch M., Bezkravnyi O., Foley S.

15.40-16.00	BEYOND LIGAND BINDING: DECODING GPCR ACTIVATION ON BUDDDED BACULOVIRUS NANOPARTICLES VIA FLUORESCENCE ANISOTROPY AND CONFORMATIONAL BIOSENSORS. Kopanchuk S., Veiksina S., Joandi E., Leht R.R, Rinken A.	O16
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16.00-17.30	Poster Session 2	P16- P30
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Moderator Olena Gnatyuk

8 OCTOBER, WEDNESDAY

Physical properties of biomolecular nanosystems

Chair ***Galina Dovbeshko***

10.00-10.30	ON THE TELOMERE MODEL OF AGING: UNRAVELLING THE HYDROGEN BONDING PATTERNS IN G-QUADRUPLEXES. FROM STRUCTURE TO FUNCTION. Kryachko E.S., MacDougall P.J., Neal S.	PL3
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Nanobiohybrids of 1-D or 2-D nanomaterials with biomolecules

Chair ***Galina Dovbeshko***

10.30-10.50	MOLYBDENUM DISULFIDE QUANTUM DOTS EXFOLIATED WITH NUCLEOTIDES: SPECTROSCOPY AND AFM CHARACTERIZATION, ANALYSIS OF TEMPORAL STABILITY Kurnosov N.V., Voloshin I.M., Lytvyn O.S., Valeev V.A., Plokhotnichenko A.M., Karachevtsev V.A.	O20
10.50-11.10	MANGANESE OXIDE NANOCRYSTALS INDUCE ERYPTOSIS, A REGULATED CELL DEATH OF MATURE RED BLOOD CELLS Tkachenko A.S., Yefimova S.L., Kot Yu.G., Klochkov V.K., Onishchenko A.I., Prokopiuk V.Yu.	O32
11.10-11.30	Mn₃O₄ NANOCRYSTALS ACTIVATE CASPASE-3 IN ERYTHROCYTES Prokopiuk V.Yu., Yefimova S.L., Klochkov V.K., Kot Yu.G., Onishchenko A.I., Tkachenko A.S.	O25

11.30-11.40

Technical break

Applied aspects of nanobiophysics

Chair

Nikita Kurnosov

- 11.40-12.00** **STRUCTURE-ACTIVITY RELATIONSHIPS IN $\text{Cu}_x\text{Co}_{1-x}\text{WO}_4$ SYSTEMS FOR DEGRADATION OF ACETAMINOPHEN UNDER SOLAR LIGHT** **O15**
Czekanowska D., Grzegórska A., Zielińska-Jurek A., Salazar H., Murauskas T., Głuchowski P.
- 12.00-12.20** **MODEL-BASED QUANTIFICATION OF SURFACE PASSIVATION EFFECTS INDUCED BY BIOGEL IMMOBILIZATION IN FIELD-EFFECT BIOSENSORS** **O7**
Karpenko Y.V., Dzyadevych S.V.
- 12.20-12.40** **COMPARATIVE MECHANISMS OF MICROVESICULATION IN RED BLOOD CELLS AND BACTERIA** **O1**
Volobuiev D.O., Berest V.P.

12.40-14.00

Time for Lunch

Applied aspects of nanobiophysics

Chair

Nikita Kurnosov

- 14.00-14.20** **DEVELOPMENT AND CRYOPRESERVATION OF PROBIOTIC-ENRICHED ALGINATE HYDROGEL FILMS FOR WOUND CARE APPLICATIONS** **O33**
Trufanov O.V., Ananina H.E., Martsenyuk V.P., Abrafiikova L.G., Nardid E.O.
- 14.20-14.40** **A RAPID, GREEN AND COST-EFFECTIVE SYNTHESIS OF PH- AND HYDROXYL GROUP SENSITIVE CARBON DOTS FOR SENSING APPLICATIONS** **O20**
Kujawa D., Ptak M., Głuchowski P.
- 14.40-15.00** **ON LIGANDS FOR «GREEN» SYNTHESIS OF LUMINESCENT Ag-In-Se NANOPARTICLES** **O22**
Nikolaienko A., Kapshuchenko O., Karlash A., Dmytruk A.

**15.00-15.20 TUNING OF ANTIBACTERIAL ACTION OF ZnO
MICROCRYSTALS BY MODIFYING SURFACE DEFECTS
WITH Fe-DOPING**

O5

Brannon J.H., Rubio E.H., Cohens N.S., Hattarki M.N.,
Strzhemechny Y.M., McGillivray S.M., Sobierajska P., Pinchuk N.,
Wiglusz R.J., Watras A., Boiko V.V., Danchuk V.V.

15.20-15.30

Technical break

Round table “History of Biophysics in Kharkiv”

15.30-17.30 Moderator Marina Kosevich

- PL7** Nanobiophysics at the B.Verkin Institute for Low Temperature Physics
RT1 and Engineering of the National Academy of Sciences of Ukraine:
a historical review
Karachevtsev V.A.
- RT2** How the Biophysics in IRE started and progressed: according to the
memoirs by V. Ya. Maleev
Shestopalova A.V.
- RT3** Biophysicists of Kharkiv National University and the Advance of
Biophysics
Berest V.P.
- RT4** Tribute to academician B.I. Verkin – the founder of the biophysical and
biomedical research at the Institute for Low Temperature Physics and
Engineering
Kosevich M.V.
- RT5** Contribution of Professor Blagoi Yu.P. to molecular biophysics of
nucleic acids
Kosevich M.V.
- RT6** In memoriam: Yu.V. Malyukin, the founder of nanobiophysics in the
Institute for Scintillation Materials of STC “Institute for Single Crystals”
Yefimova S.L., **Lisetski L.N.**
- RT7** Tribute to Professor O.M. Ogurtsov
Bliznyuk O.M.

General discussion

9 OCTOBER, THURSDAY

Applied aspects of nanobiophysics

Chair *Valentina Zobnina*

10.00-10.20	POTENTIAL OF Eu^{3+} AS A LUMINESCENT MARKER FOR RAPID MONITORING OF THE $\text{Ce}^{4+}/\text{Ce}^{3+}$ TRANSITIONS IN CeO_2 CATALYST Bezkravnyi O., Szymczak M., Marciniak L., Vorochta M.	O2
10.20-10.40	HIGH-RESOLUTION SEM MICROSCOPY FOR STUDYING LIPOSOMES AND MODEL CIRCULATING TUMOR CELLS INCUBATED WITH MoS_2 AND WS_2 NANOPARTICLES Monastyrskyi G., Olenchuk M., Gnatyuk O., Solyanik G., Kolesnyk D., Karakhim S., Dovbeshko G.	O21
10.40-11.00	THE EFFECTS OF SYNGAP KNOCKDOWN ON THE AMPA RECEPTOR SURFACE MOBILITY Hnatiuk S.I., Ignácz A., Daburon S., Breillat C., Sainlos M., Choquet D.	O13
11.00-11.10	<i>Technical break</i>	
11.10-11.30	EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE LEVIFLOXACIN-PVP COMPLEX Bulova A.G., Glamazda A.Yu., Stepanian S.G., Plokhotnichenko A.M., Karachevtsev V.A.	O6
11.30-11.50	SELF-FORMATION OF COHERENT CORRELATED STATES OF INTERACTING PARTICLES IN BIOMOLECULES FOR THE REALIZATION OF NUCLEAR FUSION IN BIOSYSTEMS Vysotskii V.I.	O35
11.50-13.00	Poster Session 3	P31- P45
13.00	<i>Closing Ceremony</i>	

POSTER SESSION 1

6 October, Monday

		page
P1	NEW APPROACHES IN THE METHODOLOGY FOR ASSESSING NANOPARTICLES OF METALS, ASBESTOS, AND PLASTICS STABILIZED BY BIOLOGICAL MOLECULES IN MODEL SOLUTIONS. Andrusyshyna I.M.*, Movchan V.O., Didikin G.G.	64
P2	INHIBITION OF <i>PSEUDOMONAS AERUGINOSA</i> GROWTH BY “GREEN” SYNTHESIZED SILVER NANOPARTICLES. Balko O.*, Balko O., Bohdanovych T., Matvieieva N.	66
P3	MASS SPECTROMETRIC ASSESSMENT OF TRANSITION METAL DICHALCOGENIDES FUNCTIONING AS NANOZYMES. Boryak O.A. *, Kosevich M.V., Shelkovsky V.S., Kuzema P.O., Pashynska V.A., Zobnina V.G., Orlov V.V., Karachevtsev V.A.	67
P4	COMPLEX FORMATION IN AQUEOUS SOLUTIONS OF BSA WITH IBUPROFEN AND SILVER NANOPARTICLES. Dmytrenko O.P.*, Doroshenko I.Yu., Lesiuk A.I., Kaniuk M.I., Davtian L.I., Drozdova A.I.	68
P5	FEMTOSECOND LASER PROCESSING OF TITANIUM DIOXIDE FILMS FOR PHOTOCATALYTIC AND SELF-CLEANING APPLICATIONS. Dmytruk I.M.*, Berezovska N.I., Hrabovskyi Ye.S., Podust G.P., Romanovska N.I., Manoryk P.A.	69
P6	THE STUDY OF THE SAFETY OF IRON OXIDE NANOPARTICLES. Dmytrukha N.M.*	70
P7	STRUCTURE AND MECHANICAL PROPERTIES OF THE POLYMER BASE OF MEDICAL SPONGES WITH THE ADDITION OF METHYLURACIL. Doroshenko I.Yu.*, Misiura A.I., Dmytrenko O.P., Lesiuk A.I., Davtian L.I., Drozdova A.I.	71
P8	STABILITY OF PROTONATED FORMS OF MONONUCLEOTIDES IN ALKALINE ENVIRONMENTS. Dotsenko M.A.*, Nikolaiev R.O., Tkachuk Z.Yu.	72
P9	A NANOCONJUGATE OF POLY-β-MALIC ACID WITH CYANINE-BASED DUAL INHIBITOR PF TELOMERASE AND TOPOISOMERASE I. Dubey L.V., Kryvorotenko D.V., Dubey I.Ya.*	73

P10	SPECTROSCOPIC MARKERS OF PHENOTHIAZINE DRUG ADSORPTION ON MESOPOROUS ANATASE TiO₂. Gavrillo T.A.*, Shymanovska V.V., Manuilov E.V., Chaika M., Drozd M.	74
P11	COMPARISON OF BSA FLUORESCENCE IN SALINE AND PHOSPHATE BUFFER SOLUTIONS UNDER GAMMA-IRRADIATION. Glibitskiy D.M.*, Gorobchenko O.A., Cheipesh T.A., Roshal A.D., Glibitskiy G.M.	75
P12	ASSESSMENT OF TRYPTOPHAN CONTENT IN THE BLOOD OROPHARYNGEAL CANCER PATIENTS AFTER COVID-19. A SIMPLE METHOD ANALYSIS. Gnatyuk I.I., Doni D.A., Verevka S.V., Tarasenko A.S., Gnatyuk O.P., Isokov T.D. *, Dovbeshko G.I.	76
P13	DESIGN OF NOVEL MOLECULES WITH ANTI-COVID-19 ACTIVITY: FROM COMPUTER SIMULATIONS TO ORGANIC SYNTHESIS. Lohachova K.O., Yevsieieva L., Zakharov A.B., Ivanov V.V.*, Kyrychenko A.V., Kovalenko S.M., Kalugin O.N.	77
P14	THE DISTINCTIVE FEATURES OF THE INFRARED VIBRATIONAL SPECTRA OF 2'-DEOXYADENOSINE AND ADENOSINE MOLECULES ISOLATED IN Ar MATRICES. Ivanov A.Yu.*, Stepanian S.G.	78
P15	RAMAN SPECTROSCOPY OF CARBON NANOTUBES WRAPPED WITH SINGLE- OR DOUBLE-STRANDED DNA OR SURROUNDED BY N-METHYLPYRROLIDONE MOLECULES: COMPARISON OF D AND G BANDS. Karachevtsev V.A.*, Kurnosov N.V., Linnik A.S.	79

POSTER SESSION 2

7 October, Tuesday

P16	PECULIARITIES OF THE ELECTROPHYSICAL PROPERTIES OF ALBUMIN MACROMOLECULES IN AQUEOUS SOLUTIONS OF SODIUM CHLORIDE. Guslisty A.A., Stoliaryk O.D., Khorolskyi O.V.*	80
P17	3D MODELS OF PROTEINS AND PUTATIVE G-QUADRUPLEXES IN PORCINE CIRCOVIRUS TYPE 3 SINGLE-STRANDED CIRCULAR DNA. Limanskaya O.Yu.*, Limanskii A.P.	81
P18	CONFIRMATION OF PERFECT G-QUADRUPLEXES IN MYCOBACTERIA TUBERCULOSIS BY ALPHAFOLD 3 ARTIFICIAL INTELLIGENCE. Limanskaya O.Yu.*, Balak O.K., Limanskii A.P.	82

P19	HYBRID POLY(N-ISOPROPYLACRYLAMIDE) HYDROGELS PHYSICALLY CROSS-LINKED BY ACID ACTIVATED LAPONITE® Samoylenko O., Samchenko Yu., Solovieva O., Kernosenko L., Poltoratskaya T., Pasmurtseva N., Ganusevich I., Vashchenko O., Lisetski L.*, Lebovka N.	83
P20	HBA1C PREDICTION FROM BLOOD FTIR-ATR SPECTRA USING CURVE FITTING AND AUTOML. Makhnii T.*, Melnychenko M., Midlovets K., Dmyterchuk B., Surovennyi M., Krasnienkov D.	84
P21	CARBON NANOPARTICLES AS BIOMOLECULAR SENSORS. Maksymuk V.S.*, Pavlenko O.L., Dmytrenko O. P., Kulish M.P.	85
P22	DRYING OF AQUEOUS SESSILE DROPLETS OF COLLOIDAL SUSPENSIONS ON BASE OF NANOPATELES OF LAPONITE RD® WITH ADDITIVES OF POLY(ETHYLENE OXIDE). Manilo M.V.*, Gigiberia V.A., Lebovka N.I	86
P23	GREEN SYNTHESIS OF SILVER NANOPARTICLES USING DIOSPYROS VIRGINIANA FRUIT EXTRACTS. Matvieieva N.*, Bohdanovych T., Klymchuk D., Zhurba M., Ivanišová E., Grygorieva O.	87
P24	FERROMAGNETIC NANOPARTICLES OF IRON/COBALT AND IRON/MANGANESE OXIDES IN AQUEOUS SOLUTIONS OF SURFACTANTS. Panchenko V.G.*, Sakhno T.V., Semenov A.O., Sakhno Y.E., Barashkov N.N.	88
P25	METASURFACE BASED NANOBIOSENSORS: COMPARATIVE ANALYSIS OF ALL-DIELECTRIC, METAL-DIELECTRIC AND GRAPHENE METASURFACE MODEL STRUCTURES. Kuznetsova K. S., Pashynska V.A.*	89
P26	A DITHIZONE METHOD FOR DETERMINING ZINC IN ZINC- BASED NANOSTRUCTURED BIOMATERIALS. Pazura Yu.I. * Bespalova I.I., Yefimova S. L.	90
P27	DFT STUDY OF TEGAFUR COMPLEXES WITH MoS₂: STRUCTURE, INTERACTION ENERGIES AND VIBRATIONAL SPECTRA. Piddubnyi T.*, Stepanian S., Adamowicz L.	91
P28	FABRICATION AND CHARACTERIZATION OF ELECTROSPUN PMMA NANOFIBERS LOADED WITH LEVOFLOXACIN OR CHLORAMPHENICOL. Plokhotnichenko A.M.*, Karachevtsev V.A., Trufanov O.V., Pashynska V.A., Kuzema P.O.	92

P29	ELECTROPHYSICAL PROPERTIES OF AQUEOUS COLLOIDAL SOLUTIONS OF FULLERENE $C_{60}@H_2O_n$. Pohribnyi M.T.* , Vinnikov N.A.	93
P30	EFFECT OF COLLOIDAL METAL NANOPARTICLES AND LOW-INTENSITY LASER LIGHT ON THE SYNTHESIS OF PHENOLIC COMPOUNDS AND ANTIOXIDANT ACTIVITY BY MEDICINAL MACROMYCETES. Poyedinok N.L.* , Mykchaylova O.B., Negriyko A.M., Potomkina Zh.V.	94

POSTER SESSION 3

9 October, Thursday

P31	QUANTUM POINT-CONTACT SENSORS. Romanov M.D. * , Harbuz D.O., Belan V.I., Pospelov O.P., Kamarchuk L.V., Gudimenko V.O., Kamarchuk G.V.	95
P32	ELECTRIC CHARGE TRANSFER IN MOLYBDENUM DISULFIDE MoS_2 NANOPOWDER OVER WIDE TEMPERATURE RANGE OF 95–350 K. Rudenko R.M. * , Voitsihovska O.O.	96
P33	ANALYSIS OF THE HEAT CAPACITY OF FLUOROSUBSTITUTED ALIPHATIC ALCOHOLS USING AN ARTIFICIAL NEURAL NETWORK. Bulavin L.A., Khorolskyi O.V., Hetalo A.M., Rudnikov Ye.G. *	97
P34	MOLECULAR SPECTROSCOPY AS A POWER TOOL IN STUDYING THE PORPHYRIN–DNA INTERACTION. Ryazanova O.A.*	98
P35	PHYSICOCHEMICAL PROPERTIES OF CHIRAL BIOMOLECULAR NANOSYSTEMS: CLUSTEROLUMINESCENCE, AIE, AND CISS. Sakhno T.V.* , Sakhno Y.E., Kuchmiy S.Y.	99
P36	INTERACTIONS IN COMPOSITES OF METHYLENE BLUE DYE WITH MoS_2 AND C_{60} FULLERENE CHARACTERIZED BY LASER DESORPTION/IONIZATION MASS SPECTROMETRY. Shelkovsky V.S.* , Kosevich M.V., Boryak O.A., Kuzema P.O., Dolbin A.V., Vinnikov N.A., Cherednichenko S.V., Karachevtsev V.A.	100
P37	THE EFFECT OF AMINO ACIDS ON THE DEGRADATION AND OXIDATION OF POROUS SILICON IN AN AQUEOUS MEDIUM. Shevchenko V.B.* , Datsenko O.I., Plyushchay I.V., Kuryliuk A.M.	101
P38	BIOPHYSICAL PROPERTIES OF GAMMA-IRRADIATED MODEL BIOMEMBRANES CONTAINING CYTOCHROME C. Sichevska L.V.*	102

P39	INTERACTION CHARACTERISTICS OF HEMOGLOBIN MOLECULES WITH ORGANOSELENIUM COMPOUNDS. Sichevska L.V. *	103
P40	SOME ASPECTS OF OPTICAL SPECTROSCOPY OF DRUGS BASED ON INDOLE DERIVATIVES. Kudrya V.Y., Tkach N.V. *, Karpenko O.S., Dubey I.Y., Naumenko A.P.	104
P41	BINDING OF NATIVE DNA TO MoS₂ NANOFLLAKES: EXPERIMENTAL AND THEORETICAL STUDIES. Usenko E.L. *, Glamazda A.Yu., Valeev V.A., Voloshin I.M., Petrushenko S.I., Stepanian S.G., Adamowicz L., Karachevtsev V.A.	105
P42	IMPACT OF SUBSTITUENTS ON THERMAL RECYCLIZATION OF 2-IMINOCOUMARINS: EXPERIMENTAL, COMPUTATIONAL, AND THEORETICAL INSIGHTS. Vashchenko O.V.*, Trostianko P.V., Vus K.O., Brodskii R.Ye., Lisetski L.N., Kovalenko S.M.	106
P43	NEMATIC LIQUID CRYSTALS DOPED WITH RESORCINOL: SUPRAMOLECULAR ARRANGEMENT AND POTENTIAL BIOMEDICAL APPLICATION. Vashchenko P.V.*, Vus K.O., Nesterkina M., Lisetski L.N.	107
P44	FEATURES OF LASER DESORPTION/IONIZATION MASS SPECTRA OF EXFOLIATED MoSe₂ AND WS₂ NANOMATERIALS. Zobnina V.G. *, Boryak O.A., Shelkovsky V.S., Kosevich M.V., Kuzema P.O., Karachevtsev V.A.	108
P45	RADIATION MODIFICATION OF THE PROPERTIES OF PEG–PVA-BASED HYDROGELS IN THE PRESENCE OF SILVER NANOPARTICLES Botvynovskyi B.O. *, Pavlenko O.L., Haponov A.M., Dmytrenko O.P., Kulish M.P., Naumenko A.P., Neimash V.B., Kravenikova L., Hildenbrandt G., Teselko P.O.	109