RUSSIAN MINISTRY OF SCIENCE AND HIGHER EDUCATION

RUSSIAN MINISTRY OF HEALTH

RUSSIAN SCIENCE FOUNDATION

STATE ATOMIC ENERGY CORPORATION ROSATOM

NATIONAL RESEARCH NUCLEAR UNIVERSITY MEPHI
(MOSCOW ENGINEERING PHYSICS INSTITUTE)

4th International Symposium and International School for Young Scientists on "Physics, Engineering and Technologies for Bio-Medicine"

October 26-30, 2019

PROGRAMME

MOSCOW

4th International Symposium and International School for Young Scientists on "Physics, Engineering and Technologies for Biomedicine"

The 4th International Symposium and International School for Young Scientists on «Physics, Engineering and Technologies for Bio-Medicine» will be held in Moscow, Russia, October 26-30, 2019 under the auspices of the Russian Ministry of Science and Higher Education, the Russian Ministry of Health and the State Atomic Energy Corporation ROSATOM. The Symposium is organized by the Institute of Engineering Physics for Biomedicine (PhysBio) of the National Research Nuclear University MEPhI (Moscow Engineering Physics Institute) in close collaboration with National Medical Research Radiological Center of the Ministry of Health of the Russian Federation and non-profit partnership «Kaluga pharmaceutical cluster».
The 4th International School is supported by the Russian Science Foundation (Grant # 19-72-30012).

Conference topics

The Symposium aims at bringing together leading scientists and experts in nuclear medicine, biophysics, bio-photonics, and emerging fields to present their achievements in the format of the invited lectures on the following topics:

- Advanced materials and methods for MRI and PET
- Bioimaging technologies and materials
- Bio-photonics for diagnosis and therapy
- Bioprinting
- Brachy-, Proton and Ion therapy methods
- Diagnosis methods, today and in the future
- Immuno-therapy
- Isotopes for medical applications
- Medical-biological aspects of radiation effects
- Nanomaterials for biomedical applications
- Plasma and laser technologies for biomedicine
- Translational medicine

The Symposium provides a unique opportunity for fruitful scientific discussions and for establishing contacts with scientists all over the world.

Official Language

The official language of the conference is English.

The format of the Symposium – invited lectures and poster sessions.

COMMITTEES

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CONTACTS

The Symposium webpage: http://physbio.mephi.ru/symp19/
The Symposium e-mail: PhysBioSymp@mephi.ru

PROGRAMME
4th International Symposium and International School for Young Scientists on "Physics, Engineering and Technologies for Biomedicine"

October 26, Saturday
MEPhI, A-407

09.00 - 10.00	***REGISTRATION***
	Session I ***Chair Prof. A. Kabashin***
10.00 – 10.40	**Andrei Kabashin,** CNRS, Aix–Marseille University, France, MEPhI, Russia *Laser-ablative nanofabrication*
10.40 – 11.20	**Dmitry Ivanov,** University of Kassel, Germany, MEPhI, Russia *Mechanism of Laser-Induced Formation of Metal Nanoparticles and Nanostructures for Biotechnological Applications: Molecular Dynamics Modeling*
11.20 – 12.00	**Anton Fojtik,** Czech Technical University in Prague, Czech Republic, MEPhI, Russia *Laser for NANO (bio-medical)* *(Pioneering pulsed laser synthesis of colloids)*
12.00 – 12.40	**Anton Popov,** MEPhI, Russia *Laser synthesis of colloidal solutions*
12.40 – 14.00	***LUNCH***
	Session II ***Chair Dr. V. Shipunova***
14.00 – 14.40	**Natalia Epstein,** MEPhI, Russia *Modern radiopharmaceuticals: myths and reality*
14.40 – 15.20	**Dmitriy Sosin** MEPhI, Russia *Modern genome editing systems*
15.20 – 16.00	**Vladimir Oleinikov,** Institute of bioorganic chemistry RAS, MEPhI, Russia *Palette of fluorescent nanocrystals for biology and medicine*

16.00 – 16.40 **Victoria Shipunova,**
Institute of bioorganic chemistry RAS, Russia
Magic bullet for cancer therapy

October 27, Sunday
MEPhI, A-407

09.00 - 10.00	***REGISTRATION***
	Session III ***Chair Dr. A. Popov***
10.00 – 10.40	**Paras Prasad,** University at Buffalo, USA, MEPhI, Russia *Laser-processed nanostructures for biomedicine*
10.40 – 11.20	**Sergey Deyev,** Institute of bioorganic chemistry RAS, MEPhI, Russia *Supramolecular multifunctional structures for theranostics*
11.20 – 12.00	**Victor Timoshenko**, MSU, MEPhI, Russia *Optical properties of silicon nanocrystals for biomedical applications*
12.00 – 12.40	**Alexey Popov,** University of Oulu, Finland *Nanoparticles for Biophotonic applications*
12.40 – 13.20	**Aleksandr Lubeshkin**, Research Center «CRYSTALLOGRAPHY AND PHOTONICS» RAS, MEPhI, Russia *Nanophosphors: synthesis and application*
13.20 – 14.00	***LUNCH***
	Session IV ***Chair Dr. T. Savelieva***
14.00 – 14.40	**Vladimir Klimanov**, Burnasyan Federal Medical Biophysical Center, MEPhI, Russia *Modern methods of radiotherapy*

14.40 – 15.20	**Andrey Postnov,** N.N. Burdenko National Scientific and Practical Center for Neurosurgery, MEPhI, Russia *Modern diagnostic methods by nuclear medicine instruments*
15.20 – 16.00	**Valeriy Mishenko,** Research clinical institute of otorhinolaryngology, Russia *Application of laser technologies in otolaryngology*
16.00 – 16.40	**Tatiana Savelieva,** A.M. Prokhorov General Physics Institute of RAS, MEPhI, Russia *New approaches to the diagnosis and treatment of brain tumors*

October 28, Monday
MEPhI, B-100

09.00 - 10.00	***REGISTRATION***
10.00 - 10.30	***OPENING CEREMONY, GREETING SPEECHES***
10.30 – 11.30	**Boris Chichkov,** Leibniz University Hannover, Germany *Laser printing of nanoparticles and living cells*
11.30 - 12.00	***COFFEE***
	Session I ***Chair Prof. S. Klimentov***
12.00 – 12.30	**Paras Prasad,** University at Buffalo, USA, MEPhI, Russia *Nanomedicine: opportunities and challenges*
12.30 – 13.00	**Valery Tuchin,** Saratov State University, Russia *Tissue optical clearing for diagnostics and therapy: from deep-UV to THz*
13.00 – 13.30	**Valentin Smirnov**, Scientific Research Institute of technical physics and automation, SC Rosatom, Russia *Rosatom's work in the field of nuclear medicine and equipment*
13.30 – 14.00	**Alexey Popov,** University of Oulu, Finland *Interaction of red blood cells in presence of engineered nanoparticles assessed by optical tweezers and SEM imaging*
14.00 - 15.00	***LUNCH***

Session II ***Chair Prof. A. Kabashin***

15.00 – 15.30 **Andrey Kaprin**,
National Medical Research Center of Radiology

15.30 – 16.00 **Igor Meglinski,**
Aston University, Birmingham, UK
Complex structured light in tissue diagnosis

16.00 – 16.30 **Andrei Kabashin**,
CNRS, Aix–Marseille University, France, MEPhI, Russia
Laser-ablative synthesis of functional nanomaterials for biomedical applications

16.30 – 17.00 **Anton Fojtik,**
Czech Technical University in Prague, Czech Republic, MEPhI
NANO - The next dimension

17.00 – 17.30 ***COFFEE***

Session III ***Chair, Prof. A. Fojtik***

17.30 – 18.00 **Sergey Kudryashov**,
P.N. Lebedev Physical Institute of RAS, MEPhI, Russia
Laser generated nano-structured surfaces for antibacterial applications

18.00 – 18.30 **Vladimir Mironov**,
3D Bioprinting Solution, MEPhI, Russia
3D Bioprinting: New Trends

18.30 – 19.00 **Sergey Klimentov,**
MEPhI, A.M. Prokhorov General Physics Institute of RAS, Russia
Femtosecond laser ablation of transparent crystals

19.00 – 21.00 ***Welcome party***

October 29, Monday
MEPhI, B-100

09.30 – 10.00	***REGISTRATION***
	Session IV Chair Prof. I. Nabiev
10.00 – 10.30	**Victor Timoshenko,** MSU, MEPhI, Russia *Silicon-based nano-theranostics*
10.30 – 11.00	**Victor Loschenov,** A.M. Prokhorov General Physics Institute of RAS, MEPhI, Russia *New trends in laser theranostics of tumor*
11.00 – 11.30	**Vladimir Lysenko**, National Institute of Applied Sciences (INSA de Lyon), France, MEPhI, Russia *New silicon-based photoelectric sensors for multidisciplinary applications*
11.30 - 12.00	***COFFEE***
	Session V Chair Prof. V. Timoshenko
12.00 – 12.30	**Igor Nabiev**, University of Reims, France, MEPhI, Russia *Light-matter hybrid states and control of chemical and biological reactions under the strong light-matter coupling*
12.30 – 13.00	**Georgii Shafeev,** A.M. Prokhorov General Physics Institute of RAS *Generation of nanoparticles of unique morphologies by laser ablation in liquids*
13.00 – 13.30	**Dmitry Gorin,** Skoltech, Moscow, Russia *Nanostructured materials and photonic tools for biomedical applications*

13.30 – 14.00	**Anton Popov,** MEPhI, Russia *Fabrication of plasmonic titanium nitride nanoparticles by femtosecond laser* ablation in liquids
14.00 – 15.00	***LUNCH, POSTER SECTION OVERVIEW***
	Session VI Chair Prof. D. Gorin
15.00 – 15.30	**Vladimir Oleinikov,** Institute of bioorganic chemistry RAS, MEPhI, Russia *Hybrid nanostructures based on plasmon or fluorescent particles and retinal-containing proteins*
15.30 – 16.00	**Sergey Andreev,** Institute for Biochemical Physics of RAS, MEPhI, Russia *Biophysical Mechanisms of Chromosome Damage: Early and Delayed Effects*
16.00 – 16.30	**Viktor Tsetlin,** Institute of bioorganic chemistry RAS, MEPhI, Russia *From structural studies of nicotinic receptors and their ligands to new drugs – a long way?*
16.30 – 17.00	**Ekaterina Barmina,** A.M. Prokhorov General Physics Institute of RAS, Russia *Laser micro- and nanostructuring of solids by sub-nanosecond laser pulses*
17.00	***COFFEE***
17.00 – 19.00	**Poster Session of the 4th International Symposium and School for Young Scientists** **"Physics, Engineering and Technologies for Biomedicine"**

October 30, Wednesday
MEPhI, B-100

09.30 – 10.00	***REGISTRATION***
	Session VII Chair Prof. S. Klimentov
10.00 – 10.30	**Irina Zavestovskaya,** MEPhI, P.N. Lebedev Physical Institute of RAS, Russia *Advanced technologies of nuclear nanomedicine and radiotherapy*
10.30 – 11.00	**Andrey Postnov,** N.N. Burdenko National Scientific and Practical Center for Neurosurgery, MEPhI, Russia *Dynamic PET studies for differential diagnosis in brain tumor in clinic*
11.00 – 11.30	**Alexey Lipengolts**, N.N. Blokhin Russian Cancer Research Center *Binary technologies of malignant tumors radiotherapy*
11.30 – 12.00	***COFFEE***
	Session VIII Chair Prof. I. Zavestovskaya
12.00 – 12.30	**Dmitry Ivanov,** University of Kassel, Germany, MEPhI, Russia *Modeling of Laser-Induced Structures for Bio-Sensing Applications in Different Media*
12.30 – 13.00	**Maxim Dokukin,** Sarov Physical and Technical Institute of MEPhI, Sarov, Russia *"Physical markers" as a prospective tool in the detection of human diseases*

13.00 – 13.30	**Dmitry Goncharuk,** Russian Medical Academy of Continuous Professional Education, Moscow, Russia *The possibility of multiparametric MRI and perspectives of artificial intelligence (AI) in the diagnosis of prostate cancer*
13.30 – 14.00	**Victoria Tishenko**, A.F. Tsyb Medical Radiological Research Center, MEPhI, Russia *Pharmacokinetic properties of a new potential tumor imaging agent based on glucose derivative and gallium-68*
14.00 – 15.00	***LUNCH***
	Session IX Chair Dr. A. Postnov
15.00 – 15.30	**Victoria Shipunova,** Institute of Biochemical Physics of RAS, Russia *Multifunctional nanostructures for oncotheranostics*
15.30 – 16.00	**Alexander Pryanichnikov,** Protom ltd, Physical-Technical Center of P.N. Lebedev Physical Institute of RAS, Protvino, Russia *Status of Protom synchrotrons for proton therapy*
16.00 – 16.30	**Ivan Zelepukin,** MEPhI, Institute of bioorganic chemistry RAS, Russia *Nanoparticle transport on red blood cells for treatment of lung cancer*
16.30 – 17.00	**Tengiz Lobzhanidze** Research and Development Institute for Technical Physics and Automation, Joint-Stock Company (NIITFA JSC), Russia *Increase image quality of x-ray image system ONYX*
17.00	***CLOSING CEREMONY***

POSTER SESSION

POSTER SESSION
October 29, Tuesday
Reading hall of the library, 2d floor

Chair: A. Popov *(PhysBio MEPhI, Russia)*

1. THE MAIN ASPECTS OF RADIATION THERAPY. COMPARISON OF 3D CONFORMAL AND INTENSELY MODULATED RADIO-THERAPY
   Zh. Abdikali, M. Abishev
2. OPTIMAL PARAMETERS OF LASER METER OPTICAL CHARAC-TERISTICS OF THE CORNEA
   A.A. Adamov, V.N. Khramov
3. MINIMIZATION OF THE NUMBER OF PROJECTIONS IN CONE BEAM X-RAY TOMOGRAPHY
   A.I. Adarova, A.E. Chernuha, A.N. Solovev
4. PROTOTYPE DEVELOPMENT OF AN X-RAY TOMOGRAPH FOR THE DIAGNOSIS OF WEAKLY ABSORBING / PHASE OB-JECTS
   L.L. Afanasev, A.S. Gogolev, S.G. Chistyakov
5. SIMULATION OF INSULIN-GLUCOSE CONCENTRATION DY-NAMICS
   A.A. Akifiev, E.V. Kabak, G.Yu. Polina, S.I Kisil, I.V. Dokukina
6. PRECISE FLUORESCENT DIAGNOSTICS OF CERVICAL NEO-PLASMS FOR PHOTODYNAMIC THERAPY
   P.M. Alekseeva, K.T. Efendiev, D.V. Yakovlev, A.A. Shiryaev, A.A. Ishchenko, A.V. Gilyadova, S.I. Samoilova, L.M. Amirkhanova, V.B. Loschenov
7. IN VITRO STUDIES OF SILICON NANOPARTICLES AS PHO-TOSENSITIZERS FOR LASER-INDUCED HYPERTHERMIA
   A. F. Alykova, V. A. Oleshchenko, A. Yu. Kharin, O.V. Karpukhina, A. A. Popov, N. V. Karpov, V. V. Bezotosnyi, S. M. Klimentov, A. V. Kabashin, O.M. Alykova, V. Yu. Timoshenko
8. LASER DEPOSITION AND STUDY SURFACE AND LUMINES-CENCE NANOPARTICLES AND FILMS SI
   S. Antonenko, S. Derzhavin, A. Harin, A. Kabashin, S. Klimentov, V. Timo-

shenko, A. Fronya

9. LIPID-CONTAINING NANOPARTICLES AS A VEHICLES OF DRUG DELIVERY SYSTEMS

   Azarov A., Khomutov G., Sybachin A., Yaroslavov A.

10. ANTHROPOMORPHIC MALE PHANTOM' DOSE ESTIMATION FOR APOLLO MISSION ASTRONAUTS WHEN CROSSING THE EARTH RADIATION BELTS

    M.A. Basova, I.M. Medzhidov, Yu.A. Kurachenko

11. POROUS SILICON BASED NANOCONTAINERS FOR PROSPECTIVE ANTITUMOR DRUG

    T. Yu. Bazylenko, I. M. Le-Deygen, A. V. Kornilova, Yu. V. Kargina, A. Yu. Kharin, M.A. Konoplyannikov, V. Yu. Timoshenko

12. FEATURES OF PENCIL BEAM SCANNED PARTICLE THERAPY OF INTRAFRACTIONALLY MOVING TUMORS: A SHORT ANALYSIS

    M.A. Belikhin, A.P. Chernyaev, A.A. Pryanichnikov, A.E. Shemyakov

13. INTERPRETATION OF READINESS POTENTIAL BY USING THE BCI FOR MANAGING BIONIC SYSTEMS

    Belov Vladimir Sergeevich, Berestov Roman Mikhailovich, Bobkov Egor Andreevic

14. SYNTHESIS OF NANO-SIZED BISMUTH FRAMEWORK FOR BIOMEDICAL APPLICATIONS

    I.Belyaev, I.Zelepukin, S.Deyev

15. RAMAN SPECTROSCOPY FOR DIFFERENTIAL DIAGNOSIS OF THE BRAIN TUMOR

    L.R. Bikmukhametova, I.D. Romanishkin, T.A. Savelieva, A.V. Kosyrkova, S.A. Goryaynov, A.A. Potapov, V.B. Loschenov

16. OPTICAL STUDIES OF A TWO-LAYER STRUCTURE OF ZNO / NANODIAMONDS (ZNO:DNDS)

    E. Boruleva, G. Chudinova

17. PROSPECTS FOR THE APPLICATION OF THE VALUES SUVMEAN, SUVPEAK, SUVMAX IN RADIONUCLIDE THERAPY OF DIFFERENTIATED THYROID CANCER 131-IODINE

    Bubnov A.A., Trukhin A.A., Sirota Y.I., Rumiantsev P.O., Degtyarev M.V.

18. AB INITIO MODELING BONDING ENERGY IN BIO-ACTIVE NANO COATINGS ON DENTAL IMPLANTS

I. Dashevskiy

19. REALISTIC NEUTRON SOURCE MODEL D-T GENERATOR FOR NEUTRON THERAPY

    A.S. Davydov, A.V. Belousov, G.A. Krusanov, M.A. Kolyvanova, V.N. Morozov

20. BIOLOGICAL EFFECTS OF SOLID RADIOACTIVE PARTICLES ON RATS

    E.N. Denisova, A.S. Snegiryov, G.V. Kozmin, Yu.A. Kurachenko

21. DEVELOPMENT OF THE KNOWLEDGE BASE OF BREAST CANCER CYTOLOGICAL DIAGNOSIS

    E.A. Druzhinina, V.G. Nikitaev, A.N. Pronichev, E.V. Polyakov, I. P. Shabalova, T.V. Djangirova, S.M. Zaitsev

22. IMPACT OF CHROMATIN SPATIAL ORGANIZATION ON DSB CLUSTERS FREQUENCY INDUCED BY LOW ENERGY IONS

    Y.A. Eidelman, I.V.Salnikov, S.V.Slanina, A.V.Aleschenko, S.G.Andreev

23. LOADING OF IODINE INTO PROMISSING SILICON BASED CARRIER FOR DIAOGNOSTIC AND THERAPEUTIC BIOMED-ICAL APPLICATIONS

    A. S. Eremina, G. Villca Sossa, N. V. Karpov, A. Yu. Kharin, A. A. Trukhin, P. O. Rumyantsev, V. Yu. Timoshenko

24. EVOLUTION OF THE PROPERTIES OF NANOMATERIALS OBTAINED BY PULSED LASER ABLATION

    S.Faizullayeva, S.M.Klimentov, A.A. Popov

25. POLYLACTIC ACID FILMS IMPLANTATION INTO THE EYE IN VIVO

    E.O. Filippova, N.M. Ivanova, V.F. Pichugin

26. SIMULATION BY FEM OF THE OPTOACOUSTIC EFFECT PRIOR TO TREATMENT BY PHOTODYNAMIC THERAPY FOR CANCER PATIENTS

    Evelyn Granizo

27. EFFECT OF ELECTROLYTE CONDUCTIVITY, SIZE AND SURFACE CHARGE OF DISPERSED NANOPARTICLES ON HEAT RELEASE IN RADIOFREQUENCY ELECTRIC FIELD

    A. A. Grigoriev, Yu. V. Kargina, A. Yu. Kharin, A. P. Kanavin, I. N. Zavestovskaya, A. V. Kabashin, V. Yu. Timoshenko

28. METAL-ORGANIC FRAMEWORKS FOR MRI
O. Griaznova, I.Zelepukin, S.Deyev
29. BiOCl NANOPLATES AS X-RAY CONTRAST AGENTS
Ivanov I.N., Zelepukin I.V., Deyev S.M.
30. PHYSICAL PROPERTIES AND POTENTIAL BIOMEDICAL APPLICATIONS OF SILICON NANOPARTICLES WITH IRON IMPURITIES
Yu.V. Kargina, A.Yu. Kharin, S. V. Savilov, A. V. Sobolev, M.V. Guyaev, I.S. Glazkova, Yu. A. Pirogov, A.M. Perepukhov, A.A. Maximychev, A.N. Vasilev, A.A. Ischenko, V. Yu. Timoshenko
31. PHYSIOLOGICALLY BASED PHARMACOKINETIC MODELING OF CERIUM OXIDE NANOPARTICLES
V.V. Kasianova, I.N. Bazhukova
32. NUCLEIC ACIDS WITH MODIFIED BACKBONE: A THEORETICAL STUDY
A. P. Klinov, A. V. Savin, A. A. Sharogradskaya, M. A. Mazo
33. DEVELOPMENT OF MODELS OF ANALYSIS OF STRUCTURAL ELEMENTS ON IMAGES OF SKIN MELANOMA
S.A. Kobelev, V.G. Nikitaev, A.N. Pronichev, E.V. Polyakov, O.B. Tamrazova, V.Yu. Sergeev
34. MODERN METHODS OF DONOR ORGANS PRESERVATION DURING REMOTE TRANSPLANTATION
A. Kolosov
35. A PROPOSED MECHANISM OF DEVELOPMENT CONTROL OF THE SERVICE OF RADIODIAGNOSIS
Komin Yu.A., Mozerov S.A., Pashkin S.B., Mozerova E.S.
36. CT AND HISTOLOGICAL SIGNS OF MUCINOUS ADENOCARCINOMA OF THE STOMACH
Komin Yu.A., Mozerov S.A., Pashkin S.B., Mozerova E.S., Kirsan I.V., Khodyrev S.A., Krasnicskaya S.K.
37. HISTOLOGICAL AND CT DIAGNOSTIC METHODS IN THE EVALUATION OF TUMOR RESPONSE TO CHEMOTHERAPY AND CHEMORADIOTHERAPY IN PATIENTS WITH LOCALLY ADVANCED GASTRIC CANCER
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