ITMO UNIVERSITY

GPI RAS

INTERNATIONAL SYMPOSIUM FUNDAMENTALS OF LASER-ASSISTED MICRO-AND NANOTECHNOLOGIES

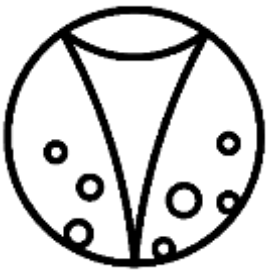
27-30 June
SAINT-PETERSBURG, RUSSIA

PROGRAM

INTERNATIONAL SYMPOSIUM FLAMN-22

Fundamentals of Laser Assisted Micro– & Nanotechnologies

PROGRAM



ITMO University

“Laser Center” Ltd

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Journal PHOTONICS Russia

LaserEcoClean

Leningrad Laser Systems

Laser Association

Laser Technology School

Russian Science Foundation

Ministry of Science and Higher Education of the Russian Federation

Resolution no. 220 (The mega grants)

June 27 - 30, 2022, St. Petersburg, Russia

flamn.itmo.ru

INTERNATIONAL SYMPOSIUM

Fundamentals of Laser Assisted Micro– & Nanotechnologies (FLAMN-22)

June 27 - 30, 2022, St. Petersburg, Russia

FLAMN-22 program include two main directions:

Laser-Assisted Micro- and Nanotechnologies and Laser-Matter Interaction

which in turn include the following sections:

- **Physical foundations of laser technologies for nanophotonics and nanoscale systems (S04)**
  (Chairmen: Tigran Vartanyan, Sergei Makarov)
- **Ultrafast Laser-Matter Interaction & Technologies (S05)**
  (Chairmen: Dmitry Ivanov, Roman Zakoldaev)
- **Surface functionalization and related phenomena (S06)**
  (Chairmen: Galina Odintsova, Maksim Sergeev)
- **Industrial applications of lasers (S07)**
  (Chairman: Sergei Gorny)

and Special scientific events:

- **School for young scientists, engineers, and students "Laser / optical systems and technologies" (S01)**
  (Chairmen: Dmitry Sinev, Anna Voznesenskaya)
- **The 3rd international scientific school on "Biomedical laser technologies" (S02)**
  (Chairmen: Andrey Belikov, Valery Tuchin, Vadim Veiko)
- **The 2nd international scientific school on "Laser-based approaches in Art & Science" (S03)**
  (Chairman: Ol'ga Smolyanskaya)

ORGANIZERS

– National Research University of Information Technologies, Mechanics & Optics ITMO University, St. Petersburg, Russia
– Prokhorov General Physics Institute of the Russian Academy of Sciences (GPI RAS), Moscow, Russia

IN COOPERATION WITH:

– LLC “Laser Center”;
– Laser Association;
– Laser Technology School;
– The Heritage Science Laboratory.

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– RESOLUTION NO. 220 (THE MEGA GRANTS)

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GENERAL INFORMATION

Symposium VENUE

The FLAMN-22 Symposium will be held
from June 27 till June 30, 2022, at St. Petersburg,
ITMO University, Lomonosova str. 9

REGISTRATION OF PARTICIPANTS

Registration of participants will take place at 9 Lomonosova str.,
St. Petersburg, Russia.
Registration will be open for participants:
June 26, 18.00 ÷ 20.00
June 27, 8.30 ÷ 11.30
June 28-30, 10.00 ÷ 11.30

TECHNICAL SESSIONS

The Symposium sessions will include oral and poster presentations. The time for plenary talks is 30 min, for invited talks - 20 min including questions and discussion, for oral presentation - 10 min including questions and discussion, for flash talk - 3 min.

The poster session will be held in two-part format. The first part is short flash talk presentations (see time and day in program). The second part is the poster session. During the poster sessions (see time schedule) presenters remain in the vicinity of their posters for informal discussion and explanations. The poster size is A1 (594x841 mm).

Presentations that participate in competition for admission to the ITMO University Master's program are marked as "S01*".

LANGUAGES

The official language of the symposium is English,
industrial session will be provided in Russian.

PROCEEDINGS

The selected papers of the Symposium will be published in

– Springer journal *"Optical and Quantum Electronics";*
– Russian bilingual journals
"Quantum Electronics", "Optics and Spectroscopy",
"*Journal of Optical Technology", "Photonics Russia".*

CONTACT PEOPLE (WhatsApp, Telegram)
+7-911-128-99-90 – Nadezhda Shchedrina (Program questions)
+7-900-650-06-68 – Victoria Shekel (Organizing questions)
+7-911-085-90-39 – Galina Odintsova (Scientific Secretary)

Daily Symposium Schedule

Monday, June 27

TIME	EVENTS
9.30 – 10.00	Opening ceremony of Symposium
10.00 – 11.30	Plenary session 1
11.30 – 12.00	Coffee break
The 3rd international scientific school on "Biomedical laser technologies" (S02)	
12.00 – 14.00	Session 1 (Room Everest)
14.00 – 15.00	Lunch time
15.00 – 17.00	Session 2 (Room Everest)
17.00 – 17.30	Coffee break
17.30 – 18.20	Session 3 (Room Everest)
Surface functionalization and related phenomena (S06)	
12.00 – 14.30	Session 1 (Room Elbrus)
14.00 – 15.00	Lunch time
15.00 – 17.00	Session 2 (Room Elbrus)
17.00 – 17.30	Coffee break
17.30 – 18.10	Session 3 (Room Elbrus)
19.00 – 21.00	**Welcome Reception**

Tuesday, June 28

TIME	EVENTS
10.30 – 11.30	Plenary session 2
11.30 – 12.00	Coffee break
The 3rd international scientific school on "Biomedical laser technologies" (S02)	
12.00 – 14.00	Session 4 (Room Everest)
14.00 – 15.00	Lunch time
15.00 – 17.15	Session 5 (Room Everest)
17.30 – 18.00	Coffee break
18.00 – 19.00	POSTERS associated with S02 section
Physical foundations of laser technologies for nanophotonics and nanoscale systems (S04)	
12.00 – 14.00	Session 1 (Room Elbrus)
14.00 – 15.00	Lunch time
15.00 – 17.00	Session 2 (Room Elbrus)
17.30 – 18.00	Coffee break

Wednesday, June 29

TIME	EVENTS
10.30 – 11.30	Plenary session 3
11.30 – 12.00	Coffee break
Ultrafast Laser-Matter Interaction & Technologies (S05)	
12.00 – 14.00	Session 1 (Room Everest)
14.00 – 15.00	Lunch time
15.00 – 17.00	Session 2 (Room Everest)
The 2nd international scientific school on "Laser-based approaches in Art & Science" (S03)	
12.00 – 14.00	Session 1 (Room Elbrus)
14.00 – 15.00	Lunch time
15.00 – 16.00	Session 2 (Room Elbrus)

Thursday, June 30

TIME	EVENTS
10.30 – 11.30	Plenary session 4
11.30 – 12.00	Coffee break
Surface functionalization and related phenomena (S06)	
12.00 – 14.00	Session 4 (Room Elbrus)
14.00 – 15.00	Lunch time
15.00 – 16.00	Session 5 (Room Elbrus)
16.00 – 17.00	POSTERS associated with S06 section
17.00 – 17.30	Coffee break
Industrial Applications of Lasers (S07)	
12.00 – 14.00	Session 1 (Room Everest)
14.00 – 15.00	Lunch time
15.00 – 16.00	POSTERS associated with S03, S05, S07 section
17.00 – 17.30	Coffee break
17.30 – 18.00	**Closing ceremony**

PLENARY SESSIONS

June 27 – 30

MONDAY, June 27

9.30 – 10.00 OPENING CEREMONY OF SYMPOSIUM

10.00–11.30 PLENARY SESSION 1 (PL 1):

CHAIRMEN: V. Veiko, A. Kolobov

10.00 PL-1 **Ultrashort pulsed laser engineering of biomimetic surfaces and related applications (online)**

E.I. Stratakis

Institute of Electronic Structure and Lasers Foundation for Research and Technology Hellas

and Department of Physics University Of Crete

Crete, Greece

10.30 PL-2 **Photoconductive terahertz antennas generation in nitrogen-doped diamond materials** (INVITED)

V.I. Konov, P.A. Chizhov, M.S. Komlenok, V.V. Kononenko, V.V. Bukin, A.A. Ushakov, V.V. Bulgakova, A.A. Khomich, A.P. Bolshakov, S.V. Garnov

General Physics Institute RAS, Moscow, Russia

11.00 PL-3 **Tissue optical clearing opens new avenues for laser technologies in medicine**

V.V. Tuchin[1-4]

[1] Science Medical Center, Saratov State University, Saratov, Russia;

[2] Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia;

[3] Laboratory of Laser Diagnostics of Technical and Living Systems, Institute of Precision Mechanics and Control, FRC "Saratov Scientific Center RAS," Saratov, Russia;

[4] A.N. Bach Institute of Biochemistry, FRC "Biotechnology RAS," Moscow, Russia.

TUESDAY, June 28

10.30–11.30 PLENARY SESSION 2 (PL 2):

CHAIRMEN: V. Konov, S. Makarov

10.30 PL-4 **Plasmon resonator hologram metasurface for generation giant optic fields**

A.K. Sarychev[1], *A. Ivanov*[1], *I. Bykov*[1], *I. Ryzhikov*[1], *K. Afanasev*[1], *N. Bakholdin*[2], *M. Mikhailov*[2], *A. Smyk*[3], *A. Shurygin*[3], *G. Barbillon*[4]

[1] Institute for Theoretical and Appliance Electrodynamics RAS, Moscow, Russia

[2] National Research University "Moscow Power Engineering

Institute", Moscow, Russia
[3] James River Branch llc, Moscow, Russia
[4] EPF-Ecole d'Ingénieurs, Cachan, France

11.00 PL-5 **Laser assisted nanotechnologies for nuclear medicine and radiology**

I. Zavestovskaya[1,2]
[1] P.N. Lebedev Physical Institute, Moscow, Russia
[2] MEPhI, 31 Kashirskoe sh., 115409 Moscow, Russia

WEDNESDAY, June 29

10.30–11.30 PLENARY SESSION 3 (PL 3):

CHAIRMEN: B. Lukiyanchuk, V. Makin

10.30 PL-6 **Resonant light scattering by subwavelength particles: new aspects of old problem**

M.I. Tribelsky

Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

11.00 PL-7 **Emerging semiconductor nanocrystal optoelectronics: pushing the limits, breaking records (online)**

H.V. Demir

Bilkent University Department of Electrical and Electronics Engineering, Department of Physics, UNAM--Institute of Materials Science and Nanotechnology, Ankara, Turkey;
NTU Singapore – Nanyang Technological University School of Electrical and Electronic Engineering, School of Physical and Mathematical Sciences, School of Materials Science and Engineering, Singapore

THURSDAY, June 30

10.30–11.30 PLENARY SESSION 4 (PL 4):

CHAIRMEN: T. Vartanyan, D. Polyakov

10.30 PL-8 **Laser technologies for perovskite photonics and optoelectronics**

S.V. Makarov

ITMO University, St. Petersburg, Russia

11.00 PL-9 **Functional chalcogenide semiconductors in optoelectronics and photonics**

A.V. Kolobov

Department of Physical Electronics, Institute of Physics, Herzen State Pedagogical University of Russia, St. Petersburg, Russia

The 3rd international scientific school on “Biomedical laser technologies” (S02)

June 27, 28

Monday, June 27

12.00–18.20 The 3rd international scientific school on "Biomedical laser technologies" (S02)

1. Laser technologies of biotissues regeneration, modification and sensing

CHAIRMEN: A.V. Belikov, D.A. Gorin

12.00 S02-1 **State of the art in laser printing of cells** (INVITED) **(online)**
B.N. Chichkov
Laser Zentrum Hannover, Germany

12.20 S02-2 **Laser technologies and tissue regeneration: working together** (INVITED)
P. Timashev
Sechenov University, Moscow, Russia

12.40 S02-3 **Anti-aging laser technologies in gynecology: problems, realities, prospects** (INVITED)
K.V. Shatilova[1], A.D. Khlopkov[1], T.M. Motovilova[2], L.Z.Sirotina [3], I.A. Kruglova [4],O.A. Pauzina[5],L.B. Spokoiniy [6]
[1] «Melsytech» LLC, Novgorod region, Russia
[2] Federal State Budgetary Educational Institution of Higher Education «Privolzhsky Research Medical University», Nizhny Novgorod, Russia
[3] State Healthcare Institution of the Nizhny Novgorod region «Nizhny Novgorod Regional Clinical Hospital named after N.A. Semashko», Nizhny Novgorod, Russia
[4] State Budgetary Healthcare Institution of the Nizhny Novgorod Region «City Hospital № 35», Nizhny Novgorod, Russia
[5] Federal Budgetary Healthcare Institution «Volga District Medical Center», Nizhny Novgorod, Russia
[6] «Medical Laser Company» LLC, St. Petersburg, Russia

13.00 S02-4 **Oral mucosa fraction laser treatment: from theory to practice** (INVITED)
E.Sergeeva[1], A.Belikov[2], Yu.Fyodorova[2], L.Ermolaeva[1], D.Fedotov[1]
[1]St. Petersburg State University, St. Petersburg, Russia
[2]ITMO University, St. Petersburg, Russia

13.20 S02-5 **Raman spectroscopy for assessment of the mineral-organic composition of hard dental tissues after in-office teeth whitening procedure (online)**
O.O. Frolov[1], P.E. Timchenko[1], E.V. Timchenko [1],L.T. Volova [2], O.A. Magsumova [2],M.A. Postnikov [2], T.V. Kozlova [1]
[1]Samara National Research University, Samara, Russia
[2]Samara State Medical University, Samara, Russia

13.30 S02-6 **Laser modification of the soft tissues in dental implantation zone (online)**

E. Zernitckaia, A. Yaremenko, A. Zernitskiy
Pavlov First Saint Petersburg State Medical University, St. Petersburg, Russia

13.40 S02-7 **Laser based non-contact optical in-vivo sensing of cilia motion** (INVITED) **(online)**

D. Duadi[1], N. Shabairou[1], A. Primov-Fever[2], Z. Zalevsky[1]
[1]Faculty of Engineering and the Nano Technology Center, Bar-Ilan University, Ramat-Gan, Israel
[2]Department of Otolaryngology and Head and Neck Surgery, Sheba Medical Center, and Sackler School of Medicine, Tel-Aviv University, Tel-Aviv, Israel

14.00–15.00 LUNCH TIME

2. Optical clearing of biotissue, laser's, nanoparticle's and terahertz applications

CHAIRMEN: A.V. Belikov, P.S. Timashev

15.00 S02-8 **Optical clearing of adipose tissue: *ex vivo* and *in vivo* studies**

I.Yu. Yanina[1,2] (INVITED)
[1]Scientific and Educational Institute of Optics and Biophotonics, Saratov National Research State University named after N.G. Chernyshevsky, Saratov, Russia
[2]Interdisciplinary Laboratory of Biophotonics, National Research Tomsk State University, Tomsk, Russia

15.20 S02-9 **Combination of micro- and nanotechnology and photonic tools for imaging, sensing, and therapy**

D.A. Gorin (INVITED)
Skolkovo Institute of Science and Technology, Russia

15.40 S02-10 **Light-activated dual-mode biocompatible nanoparticles for oncology theranostics** (INVITED)

A.O. Orlova[1], F.A. Sewid[1,2], S.A. Kabanov[1], A.V. Veniaminov[1]
[1] ITMO University, St. Petersburg, Russia
[2] Physics Department, Faculty of Science, Mansoura University, Egypt

16.00 S02-11 **Research and development both biocompatible and antibacterial covering of the titanium implants** *S01*

Yu. Karlagina,V. Veiko, M. Radaev, G. Odintsova
ITMO University, St. Petersburg, Russia

16.10 S02-12 **Ultrafast laser modification of biomolecules in biologically relevant environment** (INVITED) **(online)**

V. Gruzdev
Department of Physics and Astronomy, University of New Mexico, Albuquerque, NM, USA

16.30 S02-13 **Terahertz solid immersion microscopy: Recent achievements and challenges** (INVITED)

N.V. Chernomyrdin[1,2], M. Skorobogatiy[3], V.V. Tuchin[4,5], K.I. Zaytsev[1,2]
[1]Prokhorov General Physics Institute RAS, Moscow, Russia
[2]Bauman Moscow State Technical University, Moscow, Russia
[3]Department of Engineering Physics, Polytechnique Montreal, Canada
[4]Science Medical Center, Saratov State University, Saratov,Russia
[5]Institute of Precision Mechanics and Control, FRC "Saratov Scientific Centre of the Russian Academy of Sciences", Saratov, Russia

16.50 S02-14 **Moisture adsorption of tissue scaffolds using terahertz pulsed spectroscopy (online)** *S01*

G.R. Musina[1,2], N.V. Chernomyrdin[1,2], E.R. Gafarova[3,4], A.A. Gavdush[1,2], G.A. Komandin[1,2], I.N. Dolganova[5], K.I. Zaytsev[1,2], P.S. Timashev[3,4,6,7]
[1] Prokhorov General Physics Institute of RAS, Moscow Russia;
[2] Bauman Moscow State Technical University, Moscow, Russia;
[3] Institute for Regenerative Medicine, Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russia;
[4] World-Class Research Center "Digital Biodesign & Personalized Healthcare", Sechenov First Moscow State Medical University, Moscow, Russia;
[5] Institute of Solid State Physics of RAS, Chernogolovka, Russia;
[6] Chemistry Department, Lomonosov Moscow State University, Moscow, Russia;
[7] Department of Polymers and Composites, N. N. Semenov Institute of Chemical Physics, Moscow, Russia

COFFEE BREAK

3. Laser based nanostructures for biomedical applications

CHAIRMEN: A.V. Belikov, P.S. Timashev

17.30 S02-15 **Laser-assisted synthesis of multi-element nanostructures for biomedical applications** (INVITED) **(online)**

Yu.V. Ryabchikov, M. Flimelová
HiLASE Centre, Institute of Physics of the Czech Academy of Sciences, Dolní Břežany, Czech Republic

17.50 S02-16 **Core-Shell-Shell SPION/CdSe/ZnS Magnetoluminescent Nanoparticles Studied by Stripe Fluorescence Recovery After Photobleaching Technique (online)** *S01*

L. Borodina, A. Matyushkina, I. Vovk, A. Dubavik, A. Veniaminov, A. Orlova
ITMO University, St. Petersburg, Russia

18.00 S02-17 **Nanoparticles safety verification for their biomedical**

applications from microrheologic point of view (INVITED)
A. Lugovtsov[1], E. Shirshin[1], P. Ermolinskiy[1], Chia-Liang Cheng[2], A. Priezzhev[1]
[1]Department of Physics, Lomonosov Moscow State University, Moscow, Russia
[2]National Dong Hwa University, Shoufeng, Hualien, Taiwan

Tuesday, June 28

12.00–19.00 The 3rd international scientific school on "Biomedical laser technologies" (S02)

4. Lasers and technologies for biotissue treatment and diagnostics

CHAIRMEN: I.Yu. Yanina, V.V. Tuchin

12.00 S02-18 **Physical aspects of microsecond 1540 nm laser with burst mode application for cataract surgery** (INVITED)
A.V. Belikov [1], S.N. Smirnov [1], Yu.N. Batov [2], A.B. Gubin [2], Yu.B. Pirozhkov [2], E.A. Bekryasheva [1], A.K. Lisichnikov[1]
[1] ITMO University, St. Petersburg, Russia,
[2] Nela Ltd., St. Petersburg, Russia

12.20 S02-19 **Raman-LIBS for tumor tissue imaging and cells detection** (INVITED) **(online)**
Youyuan Chen[1], Pengkun Yin[1], Zhengying Peng[1], Qingyu Lin[2], Yixiang Duan[2]
[1] College of Life Sciences, Sichuan University, Chengdu, Sichuan, China
[2] Research Center of Analytical Instrumentation, School of Mechanical Engineering, Sichuan University, Chengdu, China

12.40 S02-20 **Rapid measurement of erythrocyte size distribution asymmetry by laser diffractometry of blood smear** (INVITED)
S01
S.Yu. Nikitin, E.G. Tsybrov, M.S. Lebedeva
M. V. Lomonosov Moscow State University, Moscow, Russia

13.00 S02-21 **Phenomenon of osmotically-induced strain in porous biological tissues and its observation with optical coherence elastography** (INVITED)
Yu.M. Alexandrovskaya[1], O.I. Baum[1], A.A. Sovetsky[2], A.L. Matveyev[2], L.A. Matveev[2], V.Y. Zaitsev[2]
[1]Institute of Photon Technologies, FSRC "Crystallography and Photonics" of RAS, Moscow, Russia
[2]Institute of Applied Physics, Russian Academy of Sciences, Nizhny Novgorod, Russia

13.20 S02-22 **Semiconductor lasers for the mid-wavelength infrared range** (INVITED)
K. Mynbaev[1], A. Semakova[1], M. Ruzhevich[2]

[1]Ioffe Institute, St Petersburg, Russia
[2]ITMO University, St Petersburg, Russia

13.40 S02-23 **Mid-infrared stimulated emission and optical properties of InAs(Sb)-based LED heterostructures**
A. Semakova[1], K. Mynbaev[1,2], N. Bazhenov[1], M. Ruzhevich[2]
[1] Ioffe Institute, St Petersburg, Russia
[2] ITMO University, St Petersburg, Russia

13.50 S02-24 **Low-charged nanostructured metal on a semiconductor for antibacterial application**
D.A. Zayarny [1], L.F. Khaertdinova [1], A.A. Nastulyavichus [1], E.R. Tolordava [1,2], S.I. Kudryashov [1]
[1] P. N. Lebedev Physical Institute of RAS, Moscow, Russia
[2] N.F. Gamaleya Federal Research Centre of Epidemiology and Microbiology, Moscow, Russia

14.00–15.00 LUNCH TIME

5. Laser technologies for blood parameters sensing

CHAIRMEN: Yu.M. Alexandrovskaya, V.V. Tuchin

15.00 S02-25 **Long term experience of laser technologies application for studying blood microrheology and microcirculation** (INVITED)
A. Priezzhev[1], A. Lugovtsov[1], P. Ermolinskiy[1], A. Semenov[2], Kisung Lee[3], S. Nikitin[1], Yu. Gurfinkel[4]
[1]Department of Physics, Lomonosov Moscow State University, Moscow, Russia
[2]Department of Biology, Lomonosov Moscow State University, Moscow, Russia
[3]Center for Soft and Living Matter, Institute of Basic Science, Ulsan, Korea

15.20 S02-26 **Developing a lightsheet-based cytometer for the whole undiluted blood with magnetic separation of objects** (INVITED)
D. Bratashov[1], O. Grishin[1], I. Kozhevnikov[1], O. Sindeeva[2], O. Mayorova[1], R. Verkhovskii[1], A. Ermakov[1], M. Makarkin[1], E. Prikhozhdenko[1]
[1] Saratov state university, Laboratory of Biomedical photoacoustics, Saratov, Russia
[2] Skolkovo Institute of Science and Technology, Skolkovo, Russia

15.40 – 17.15 Flash talks (Short presentations of posters)

CHAIRMEN: D.N. Bratashov, V.V. Tuchin, V.P. Veiko

15.40 FT-S02-1 **Red blood cell behavior in the laser trapping beam of optical tweezers (online)** *S01*
P. Ermolinskiy, A. Lugovtsov, A. Priezzhev
Department of Physics, Lomonosov Moscow State University, Moscow, Russia

15.45 FT-S02-2 **Optimization of parameters of 980-nm laser hair extension** *S01**
V.M. Ermolaev, Yu.V. Fyodorova
ITMO University, St. Petersburg, Russia

15.50 FT-S02-3 **Investigation of active laser delivery of photosensitizing drugs for the treatment of mycoses (online)** *S01*
A.V. Belikov, A.D. Kozlova, Yu.V. Fyodorova, S.N. Smirnov
ITMO University, St. Petersburg, Russia

15.55 FT-S02-4 **Optimization of endovasal laser treatment based on the analysis of the IR signal accompanying heating of a titanium-containing optothermal fiber converter (online)** *S01*
Do Thanh Tung, A.V. Belikov, Yu.V. Fyodorova
ITMO University, St. Petersburg, Russia

16.00 FT-S02-5 **Investigation of the influence of the intensity and duration of visible range light exposure on the absorption spectrum of chlorine-containing photosensitizing drugs**
Yu.V. Fyodorova, A.V. Belikov, A.D. Kozlova, S.N. Smirnov
ITMO University, St. Petersburg, Russia

16.05 FT-S02-6 **Refractive properties of healthy and pathologically altered tissues of the kidney and breast, measured at selected laser wavelengths in the visible and near-IR ranges** *S01*
E. N. Lazareva [1,2], N.A. Shushunova [,1], V.V. Tuchin[1,2,3], E.A. Genina[1,2]
[1]Saratov National Research State University named after N.G. Chernyshevsky Saratov, Russia
[2]National Research Tomsk State University, Tomsk, Russia
[3] Institute of Precision Mechanics and Control RAS , Saratov, Russia

16.10 FT-S02-7 **Study of the effect of photodynamic exposure on the optical characteristics of healthy and pathological tissues** *S01*
E.N. Lazareva,[1,2] D.K. Tuchina,[1,2] A.A. Doronkina,[1] R.A. Anisimov,[1] R.A. Verkhovsky,[1] M.V. Lomova,[1] A.M. Mylnikov,[3] N.A. Navolokin,[3] V.I. Kochubey,[1] I.Yu. Yanina[1,2]
[1] Research Educational Institute of Optics & Biophotonics, Saratov National Research State University named after N.G. Chernyshevsky, Saratov, Russia
[2]Interdisciplinary Laboratory of Biophotonics, National Research Tomsk State University, Tomsk, Russia
[3]Saratov State Medical University named after V. I. Razumovsky, Saratov, Russia

16.15 FT-S02-8 **Inactivation of coronaviruses under the UVA LEDs radiation**

A.A. Fronya[1,2], V.A. Gushchin[3], L.I. Russu[3], E.A. Cheshev[1,2], A.V. Kabashin[2,4], I.N. Zavestovskaya[1,2]
[1] P.N. Lebedev Physical Institute, RAS, Moscow, Russia
[2] National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russia
[3] National Research Centre for Epidemiology and Microbiology named after the Honorary Academician N. F. Gamaleya of the Ministry of Health of the Russian Federation, Moscow, Russia
[4] Aix Marseille Univ, CNRS, LP3, Campus de Luminy, Marseille, France

16.20 FT-S02-9 **Antibacterial surfaces, their properties and methods of preparation** *S01*

E. Lovushkina, K. Mikhailova, G. Odintsova, Yu. Karlagina
ITMO University, St. Petersburg, Russia

16.25 FT-S02-10 **Laser formation of an antibacterial surface on the jaw membrane** *S01*

A. Zavyalova, M. Radaev, Yu. Karlagina, G. Odintsova
ITMO University, St. Petersburg, Russia

16.30 FT-S02-11 **Photodynamic inactivation of bacterial clinical isolates from the tracheobronchial tree using methylene blue (online)**

E.V. Akhlyustina[1], I.G. Tiganova[3], G.A. Meerovich[1,2], I.D. Zulufova[4], V.D. Parshin[4], Yu.M. Romanova[3,4], V.B. Loschenov[1,2]
[1] National Research Nuclear University “MEPhI”, Moscow, Russia
[2] Prokhorov General Physics Institute RAS, Moscow, Russia
[3] Gamaleya National Research Center of Epidemiology and Microbiology, Moscow, Russia
[4] I.M. Sechenov First Moscow State Medical University, Moscow, Russia

16.35 FT-S02-12 **Optoacoustic monitoring of bilirubin photodegradation: in vitro and in silico studies** *S01*

S. Perkov[1], S. Perevoschikov[1], O. Grishin[2], R. Esenaliev[3], D. Gorin[1]
[1] Center for Photonics and Quantum Materials, Skolkovo Institute of Science and Technology, Russia
[2] Institute of Physics, Saratov State University, Saratov, Russia
[3] Department of Neuroscience, Cell Biology, and Anatomy,

University of Texas, Medical Branch, USA

16.40 FT-S02-13 **Complex model of accumulative laser heating of metal, semiconductor, and hard biological tissue**
A.A. Shamova, D.S. Polyakov, G.D. Shandybina
ITMO University, Saint Petersburg, Russia

16.45 FT-S02-14 **Mid-IR laser inactivation of pathogenic bacteria**
S.N. Shelygina[1], V.O. Kompanets[2], E.R. Tolordava[1,3], S.I. Kudryashov[1], Y.K. Yushina[4]
[1] Lebedev Physical Institute RAS, Moscow, Russia
[2] Institute of Spectroscopy RAS, Troitsk, Russia
[3] Gamaleya National Research Center for Epidemiology and Microbiology, Moscow, Russia
[4] V.M. Gorbatov Federal Scientific Center for Food Systems RAS, Moscow, Russia

16.50 FT-S02-15 **Analysis of efficiency of photodynamic teeth bleaching assisted with methylene blue and chlorine-containing photosensitizing drug** *S01*
Yu.V. Fyodorova, V.S. Minko
ITMO University, St. Petersburg, Russia

16.55 FT-S02-16 **Analysis of diffraction patterns in laser ektacytometry of erythrocytes (online)** *S01*
M.S. Lebedeva, E.G. Tsybrov, S.Yu. Nikitin
M. V. Lomonosov Moscow State University, Moscow, Russia

17.00 FT-S02-17 **One-stage processing technology of laser structuring of the dental implant and the preclinical study results** *S01*
Yu. Karlagina, M. Radaev, V. Veiko, G. Odintsova, V. Romanov
ITMO University, St. Petersburg, Russia

17.05 FT-S02-18 **Laser diode illumination system for laboratory experiments to study the connection between rodent behavior and the brain** *S01**
I. Mazanov, K. Ezhova
ITMO University, Saint-Petersburg, Russia

COFFEE BREAK

18.00 – 19.00 POSTER SESSION:

POSTERS associated with S02 section (FT-S02-1 ÷ FT-S02-19):
CHAIRMEN: Yu.V. Fyodorova, D.A. Sinev

See also Plenary presentations:

11.00 Mon, June 27	PL-3	**Tissue optical clearing opens new avenues for laser technologies in medicine** *V.V. Tuchin*[1-4] [1] Science Medical Center, Saratov State University, Saratov, Russia; [2] Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia; [3] Laboratory of Laser Diagnostics of Technical and Living Systems, Institute of Precision Mechanics and Control, FRC "Saratov Scientific Center RAS," Saratov, Russia; [4] A.N. Bach Institute of Biochemistry, FRC "Biotechnology RAS," Moscow, Russia.
11.00 Tue, June 28	PL-5	**Laser assisted nanotechnologies for nuclear medicine and radiology** *I. Zavestovskaya*[1,2] [1] P.N. Lebedev Physical Institute, Moscow, Russia [2] MEPhI, 31 Kashirskoe sh., 115409 Moscow, Russia

The 2nd international scientific school on “Laser-based approaches in Art & Science” (S03)

June 29

Wednesday, June 29

12.00–16.30 The 2nd international scientific school on "Laser-based approaches in Art & Science" (S03)

1. Information, terahertz & and optical technologies for Art

CHAIRMEN: O. Smolyanskaya, S.Sirro

12.00 S03-1 **Modigliani's paintings as a model for Augmented Art Object (AAO)** (INVITED) **(online)**

V. Detalle[1,2,3], A. Genty-Vincent[1], M. Menu[2,4], R. Pilay[1]
[1] C2RMF, Palais du Louvre, Paris, France.
[2] Heritage Science laboratory, ITMO University, St. Petersburg, Russia.
[3] ESPADON (21-ESRE-0050), Fondation des Sciences du Patrimoine, Paris, France
[4] Visiting Principal Research Scientist, Cyprus Institute, STARC-APAC, Aglantzia, Nicosia, Cyprus

12.20 S03-2 **Terahertz C-scans of the test object in the spectral range from 0.1 to 2.5 THz** (INVITED)

O.A. Smolyanskaya[1], S.V. Sirro[1,2], A.A. Lykina[1], O.A. Malaya[1], I. Andreev[1,2], A.V. Minin[2], V.Yu. Toropov[2], O.V. Kravtsenyuk[1], A.A. Smolyanskaya[1,2], M. Menu[1]
[1] Heritage Science lab, ITMO University, Saint-Petersburg, Russia
[2] The State Russian Museum, Saint-Petersburg, Russia

12.40 S03-3 **An example of the reconstruction of the author's color solution of the monument of ancient Russian carved polychrome sculpture, based on natural science data**

S. Sirro[1,2], A. Zhuravleva[1]
[1] The State Russian Museum, Saint-Petersburg, Russia
[2] Heritage Science lab, ITMO University, Saint-Petersburg, Russia

12.50 S03-4 **Technological aspects of yellow glazed tiles of Kievan Rus'**

V.A. Aseev[1], Yu. Mironov[1], D.S. Prokuratov[2], M.A. Isaeva[1], N.A. Bulygina[1], D.D. Jolshin[2], N.V. Nikonorov[1]
[1] Heritage Science lab, ITMO University, St. Petersburg, Russia
[2] The State Hermitage Museum, St. Petersburg, Russia

13.00 S03-5 **Green glazed architectural ceramics of Kievan Rus'**

V.A. Aseev[1], Yu. Mironov[1], D.S. Prokuratov[2], N.A. Bulygina[1], A Frolova[1], D.D. Jolshin[2], N.V. Nikonorov[1]
[1] Heritage Science lab, ITMO University, St. Petersburg, Russia
[2] The State Hermitage Museum, St. Petersburg, Russia

13.10 S03-6 **Creation and investigation by FT-IR spectroscopy of a test object based on a copy of a 19th-century painting by I.K. Aivazovsky** *S01*

I.I. Andreev[1,2], S.V. Sirro[1,2], A.A. Lykina[1], A.A. Smolyanskaya[1,2],

A.V. Minin[2], O.V. Kravtsenyuk[1], M. Menu[1], O.A. Smolyanskaya[1]
[1] Heritage Science lab, ITMO University, St. Petersburg, Russia
[2] The State Russian Museum, Saint-Petersburg, Russia

14.00–15.00 LUNCH TIME

2. Laser methods for art objects creating, cleaning and studying

CHAIRMEN: D. Prokuratov, V. Veiko

15.00 S03-7 **Laser paintbrush as a new tool of modern art: from a color laser marking to a laser painting** (INVITED)
V. Veiko, G. Odintsova, L. Van Cuong, D. Lutoshina
ITMO University, Saint Petersburg, Russia

15.20 S03-8 **Laser paintbrush. Traditions of innovations in art**
A.I. Bagautdinov[1], A.A. Alexandrova[2]
[1] Saint Petersburg Stieglitz State Academy of Art and Design, Saint-Petersburg, Russia
[2] Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia

15.30 FT-S03-1 **Using a laser as an artist's brush** *S01*
D.S. Lutoshina, V.P. Veiko
ITMO University, St. Petersburg, Russia

15.35 FT-S03-2 **Development of the "ITMO" installation using laser coloring technology** *S01**
A.A. Morozova, V.V. Romanov, L.A. Okman, G.V. Odintsova
ITMO University, St. Petersburg, Russia

15.40 S03-9 **Laser cleaning of archaeologically corroded copper**
D.S. Prokuratov[1,2], O.S. Vereshchagin[3], N.S. Kurganov[4,5], A.A. Samokhvalov[6], D.V. Pankin[7], A.V Povolotckaia[7] , A.A. Shimko[7], A.A. Mikhailova A.A.[7]
[1]Heritage Science laboratory, ITMO University, St. Petersburg, Russia
[2]The State Hermitage Museum, St. Petersburg, Russia
[3]Mineralogical Department, Institute of Earth Sciences, Saint-Petersburg State University, St. Petersburg, Russia
[4]Conservation Department, Faculty of Arts, Saint Petersburg State University, St. Petersburg, Russia
[5]Institute of the History of Material Culture RAS, St. Petersburg, Russia
[6]International laboratory "Laser micro-and nanotechnologies", ITMO University, St. Petersburg, Russia
[7]Center for optical and laser materials research, Saint-Petersburg State University, St. Petersburg, Russia

15.50 S03-10 **Sampling of paint layers using laser ablation** *S01*
A.E. Dedova, I.A. Balakhnina, N.N. Brandt, A.Yu. Chikishev
Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia

Thursday, June 30

15.00–16.00 POSTER SESSION:

POSTERS associated with S03 section (FT-S03-1 ÷ FT-S03-2)

CHAIRMEN: M.K. Moskvin, D.A. Sinev

Physical foundations of laser technologies for nanophotonics and nanoscale systems (S04)

June 28

TUESDAY, June 28

12.00–17.00 Physical foundations of laser technologies for nanophotonic and nanoscale systems (S04)

1. Nanophotonics in sensing and other applications

CHAIRMEN: T.A. Vartanyan

12.00 S04-1 **Optics of micrometer dielectric spheres** (INVITED)
B.S. Lukiyanchuk
Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

12.20 S04-2 **Strong optical dichroism of laser-modified self-assembled silver nanostructures** (INVITED)
I.A. Gladskikh, D.R. Dadadzhanov, G. Alexan, N.A. Toropov, A.A. Starovoytov, R.A. Zakoldaev, T.A. Vartanyan
ITMO University, St. Petersburg, Russia

12.40 S04-3 **Simulation of an intrafiber sensor structure obtained by optical breakdown**
Yu.A. Konin [1], V.A. Shcherbakova [2], N.A. Grachev [2]
[1] ITMO University, Saint Petersburg, Russia
[2] Perm National Research Polytechnic University, PJSC PNPPK, Perm, Russia

13.00 S04-4 **Terahertz opal nanocomposites with a wide refractive index range (online)** *S01*
V.E. Ulitko[1], G.M. Katyba[1,2], G.A. Komandin[2], G.A. Emelchenko[1], V.N. Kurlov[1], V.M. Masalov[1], K.I. Zaytsev[2,3,4]
[1] Institute of Solid State Physics of RAS, Russia
[2] Prokhorov General Physics Institute of RAS, Russia
[3] Institute for Regenerative Medicine, Sechenov University, Russia
[4] Bauman Moscow State Technical University, Russia

13.10 S04-5 **Sapphire shaped crystals: From THz-wave delivery to super-resolution imaging**
G.M. Katyba[1,2,3], K.I. Zaytsev[2,3], N.V. Chernomyrdin[2,3], D.G. Melikyants[3], V.N. Kurlov[1,3]
[1] Institute of Solid State Physics of the RAS, Chernogolovka, Russia
[2] Prokhorov General Physics Institute of the RAS, Moscow, Russia
[3] Bauman Moscow State Technical University, Moscow, Russia

13.20 S04-6 **Terahertz endoscope based on the solid immersion effect with subwavelength spatial resolution (online)** *S01*
A.S. Kucheryavenko[1,2], V.A. Zhelnov[2,3], G.M. Katyba[1,2], N.V. Chernomyrdin[2,3], K.I. Zaytsev[2,3], V.N. Kurlov[1]
[1] Institute of Solid State Physics of the RAS, Chernogolovka,

Russia
[2] Prokhorov General Physics Institute of the RAS, Moscow, Russia
[3] Bauman Moscow State Technical University, Moscow, Russia

13.30 S04-7 **Design of a laser sensor for detection and resolution of small-sized objects** *S01*
A.A. Chebotarev [1], V.A. Komisarov [1], R.M. Akhmadullin [2], D.E. Kukushkin [1], D.A. Sinev [1]
[1] ITMO University, Saint Petersburg, Russia
[2] AO NPP Signal, Saint Petersburg, Russia

13.40 S04-8 **Dye's fluorescence amplification by nanostructures on the AlZnO:Ag films: fabrication and application** *S01*
A.D. Dolgopolov, V.R. Gresko, M.M. Sergeev
ITMO University, St. Petersburg, Russia

14.00–15.00 LUNCH TIME

2. Novel optical routes to nanostructures fabrication

CHAIRMEN: A.K. Sarychev

15.00 S04-9 **Laser technologies: nanoparticle production and shock peening** (INVITED)
N.A. Inogamov [1,2,3], V.V. Zhakhovsky [2,3], V.A. Khokhlov [1], E.A. Perov [3], V.V. Shepelev [4], Yu.V. Petrov [1], S.V. Fortova [4]
[1] The Landau Institute for Theoretical Physics of RAS, Chernogolovka, Russia
[2] Dukhov All-Russian Scientific Research Institute of Automation, Rosatom, Moscow, Russia
[3] Joint Institute for High Temperatures of RAS, Moscow, Russia
[4] Institute of Computer Aided Design of RAS (ICAD RAS), Moscow, Russia

15.20 S04-10 **Polynomial and machine-learning interatomic potentials for laser excited solids** (INVITED) **(online)**
B. Bauerhenne, P. Plettenberg, M.E. Garcia
Theoretical Physics, Department of Mathematics and Natural Sciences, University of Kassel, Kassel, Germany

15.40 S04-11 **Structural coloring and anti-counterfeiting enabled by direct femtosecond laser printing** (INVITED)
A.A. Kuchmizhak [1,2]
[1]Far Eastern Federal University, Vladivostok, Russia
[2]Institute of Automation and Control Processes, Far Eastern Branch, RAS Vladivostok, Russia

16.00 S04-13 **Micro and nano powder production with conical laser beams and inert gas flow condensation**
Yu. Chivel
Additive Technologies Lab, Minsk, Belarus

16.10 S04-14 **Laser radiation impact on pseudoisocyanine J-aggregates**

deposited on an Al_2O_3/Ag hybrid film *S01**
R.D. Nabiullina, I.Yu. Nikitin, L.N. Borodina, I.A. Gladskikh, A.A. Starovoytov, R.A. Zakoldaev
ITMO University, St. Petersburg, Russia

16.20 S04-15 **Creation of quasi-regular nanodomain structures in ferroelectrics by pulse IR laser irradiation (online)**
M. Kosobokov, V.Ya. Shur, A. Makaev, D. Kuznetsov, M. Nebogatikov
Institute of Natural Sciences and Mathematics, Ural Federal University, Ekaterinburg, Russia

See also Plenary presentations:

10.30 Tue, June 28 PL-4 **Plasmon resonator hologram metasurface for generation giant optic fields**
A.K. Sarychev [1], A. Ivanov [1], I. Bykov [1], I. Ryzhikov [1], K. Afanasev [1], N.Bakholdin [2], M.Mikhailov [2], A.Smyk [3], A. Shurygin [3], G. Barbillon [4]
[1] Institute for Theoretical and Appliance Electrodynamics RAS, Moscow, Russia
[2] National Research University "Moscow Power Engineering Institute", Moscow, Russia
[3] James River Branch llc, Moscow, Russia
[4] EPF-Ecole d'Ingénieurs, Cachan, France

10.30 Wed, June 29 PL-6 **Resonant light scattering by subwavelength particles: new aspects of old problem (online)**
M.I. Tribelsky
Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

“Ultrafast Laser-Matter Interaction & Technologies” (S05)

June 29

WEDNESDAY, June 29

12.00–18.00 "Ultrafast Laser-Matter Interaction & Technologies" (S05)

1. Glass and transparent materials processing

CHAIRMEN: D. Ivanov, R. Zakoldaev

12.00 S05-1 **Unexpected pulse repetition rate effect on femtosecond laser-induced birefringent structures in alkali-containing glass** (INVITED)
S.V. Lotarev, A.S. Lipatiev, S.S. Fedotov, A.I. Pomigueva, V.N. Sigaev
Mendeleev University of Chemical Technology, Moscow, Russia

12.20 S05-2 **Single-shot compressed optical field topography (online)**
Zhengyan Li
Huazhong University of Science and Technology, Wuhan, China

12.30 S05-3 **Peculiarities of UV ultrashort laser radiation interaction with dielectrics**
V.S. Makin[1], R.S. Makin[2]
[1] Peter the Great St. Petersburg Polytechnic University, Nuclear Energy Institute, Sosnovyi Bor, Leningrad Oblast, Russia
"Kometa" corporation – NPC OEKN, Saint-Petersburg, Russia
[2] National Nuclear Research University, MIFI, Moscow, Russia

12.40 S05-4 **Femtosecond laser treatment of transparent glass-ceramics**
S01
A.S. Naumov, A.S. Lipatiev, G.Yu. Shakhgildyan, S.S. Fedotov, S.V. Lotarev, V.N. Sigaev
Mendeleev University of Chemical Technology, Moscow, Russia

2. Fundamental aspects of ultrafast laser-matter interaction

CHAIRMEN: D. Ivanov, R. Zakoldaev

12.50 S05-5 **Molecular dynamics simulation of structural evolution in alloys under ultrafast laser irradiation** (INVITED) **(online)**
S01
D. Iabbaden[1], C. Fusco[2], J. Amodeo[2], F. Garrelie[1], JP. Colombier[1]
[1]Univ Lyon, UJM-Saint-Etienne, CNRS, Institute of Optics Graduate School, Laboratoire Hubert Curien UMR 5516, F-42023 St-Etienne, France
[2]Univ Lyon, INSA Lyon, CNRS, MATEIS, UMR 5510, F-69621 Villeurbanne, France

13.10 S05-6 **Influence of band filling effects on optical properties of semiconductors under the action of intense femtosecond laser pulses**
D.S. Polyakov, G.D. Shandybina, A.A. Shamova
ITMO University, Saint Petersburg, Russia

13.20 S05-7 **Modeling of nanoparticles formation process due to pulsed laser ablation in liquids** (INVITED)
D.S. Ivanov[1,2], S.M. Klimentov[2], I.N. Zavestovskaya[1], A. Popov[2], P. Shahov[2], A.V. Kabashin[2]
[1] P. N. Lebedev Physical Institute of Russian Acad. Sci., Moscow, Russia
[2] MEPHI, Institute of Engineering Physics for Biomedicine Moscow, Russia

13.40 S05-8 **Mechanisms of surface structuring by short and ultrashort laser pulses in axial magnetic field (online)**
V. Gruzdev
Department of Physics and Astronomy, University of New Mexico, Albuquerque, USA

13.50 FT-S05-1 **Differentiated contribution of relaxation and recombination processes to silicon heating under the action of femtosecond laser radiation**
A.A. Shamova, D.S. Polyakov, G.D. Shandybina
ITMO University, Saint Petersburg, Russia

14.00–15.00 LUNCH TIME

3. Glass and transparent materials processing

CHAIRMEN: R. Zakoldaev, A. Ramos-Velazquez

15.00 S05-9 **Laser direct writing waveguide with variable cross section and its application in on-chip mode conversion (online)**
Zhong Lijing [1], Wang Yuying [1], Yang Yi [2], Chen Zhi [1], Tan Dezhi [1], Qiu Jianrong [2]
[1] Zhejiang Lab, Hangzhou, China
[2] State Key Laboratory of Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, Hangzhou, China

15.20 S05-10 **Femtosecond laser fabrication of optofluidic elements in nanoporous silicate matrices**
R.A. Zakoldaev [1], V.A. Yakimuk [1], Y.I. Yandybaeva [1], A.S. Shishkina [1], A.E. Rupasov [1,2], P.A. Danilov [2], N.A. Smirnov [1,2], S.I. Kudryashov [2], O.V. Andreeva [1], V.P. Veiko [1]
[1]ITMO University, St. Petersburg, Russia
[2]P.N. Lebedev Physical Institute of RAS, Moscow, Russia

15.30 S05-11 **Laser induced of periodic nanostructures in the bulk and on the surface of dielectrics** *S01*
A.E. Rupasov [1,2], P.A. Danilov [1], N.A. Smirnov [1,2], S.I. Kudryashov [1], R.A. Zakoldaev [2]
[1] P.N. Lebedev Physical Institute of RAS, Moscow, Russia
[2] ITMO University, St. Petersburg, Russia

15.40 S05-12 **Laser-induced optical activity of porous glass**

impregnated with metal nanoparticles *S01*
D.R. Dadadzhanov, A.A. Sapunova, Y.I. Yandybaeva, R.A. Zakoldaev, I.A. Gladskikh, T.A. Vartanyan
ITMO University, St. Petersburg, Russia

15.50 FT-S05-2 **Direct laser writing of microchannel inside transparent optical material**
A.S. Shishkina, R.A. Zakoldaev, O.V. Andreeva
ITMO University, St. Petersburg, Russia

15.55 FT-S05-3 **Structuring and permeability control of nanoporous silicate matrices by femtosecond laser pulses**
Y.I. Yandybaeva, A.A. Sapunova, R.A. Zakoldaev, O.V. Andreeva
ITMO University, St. Petersburg, Russia

16.00 FT-S05-4 **Laser-induced micromachining inside solid glass to fabricate micro-structures for microfluidics**
K. Barhoum, A.S. Shishkina, R.A. Zakoldaev
ITMO University, St. Petersburg, Russia

16.05 FT-S05-5 **Femtosecond direct laser writing of optical channel bulk waveguides in nanoporous silicate matrix**
V.A. Yakimuk, D.O. Valkov, R.A. Zakoldaev, O.V. Andreeva
ITMO University, St. Petersburg, Russia

16.10 FT-S05-6 **Laser direct writing of volume diffraction elements in glass: design, fabrication, and testing**
R.A. Zakoldaev, Li Chunyu, O.V. Andreeva
ITMO University, St. Petersburg, Russia

4. Thin films laser processing

CHAIRMEN: R. Zakoldaev, S. Kudryashov

16.15 S05-13 **Femtosecond laser anisotropic structuring GST225 thin films (online)** *S01*
A. Kolchin[1], S. Zabotnov[1], D. Shuleiko[1], M. Martyshov[1], L. Golovan[1], D. Presnov[1,2,3], V. Glukhenkaya[4], P. Lazarenko[4], T. Kunkel[5,6], S. Kozyukhin[6], P. Kashkarov[1]
[1]Faculty of Physics, Lomonosov Moscow State University (MSU), Moscow, Russia;
[2]Skobeltsyn Institute of Nuclear Physics, Lomonosov MSU, Moscow, Russia;
[3]Quantum Technology Center, Lomonosov MSU, Moscow, Russia;
[4]Institute of Advanced Materials and Technologies, National Research University of Electronic Technology, Zelenograd, Russia;
[5]Moscow Institute of Physics and Technology, Dolgoprudny, Russia;
[6]Kurnakov Institute of General and Inorganic Chemistry RAS,

Moscow, Russia

16.25 S05-14 **Modeling ultrafast laser ablation of aluminum films (online)** *S01*

J.C.D. Bustamante[1], D. Ivanov[2], D. Biasetti[3], G.M. Bilmes[4]
[1] Centro de Investigaciones Ópticas (CONICET-CIC-UNLP) and Universidad Nacional de La Plata, Buenos Aires, Argentina
[2] P. N. Lebedev Physical Institute of RAS, Russia
[3] Comisión Nacional de Energía Atómica, Gerencia LASIE, Argentina
[4] Centro de Investigaciones Ópticas (CONICET-CIC-UNLP) and DCB-FI-Universidad Nacional de La Plata, Buenos Aires, Argentina

15.35 S05-15 **Femtosecond laser-induced structural and electrophysical anisotropy of the amorphous silicon films**

D.V. Shuleiko[1], S.V. Zabotnov[1,2], M.N. Martyshov[1], D.E. Presnov[3,1,4], P.K. Kashkarov[1,2]
[1] Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia
[2] National Research Centre «Kurchatov Institute», Moscow, Russia
[3] Lomonosov Moscow State University, Skobeltsyn Institute of Nuclear Physics, Moscow, Russia
[4] Quantum Technology Centre, Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

16.45 FT-S05-7 **Nanostructuring of chromium and germanium nitrides films with near-IR and Vis femtosecond laser pulses**

K. Bronnikov[1], S. Gladkikh[1], K. Okotrub[1], E. Mitsai[2], A. Kuchmizhak[2,3], A. Dostovalov[1]
[1] Institute of Automation and Electrometry SB RAS, Russia
[2] Institute of Automation and Control Processes of the FEB RAS, Vladivostok, Russia
[3] Pacific Quantum Center, Far Eastern Federal University, Vladivostok, Russia

Thursday, June 30

15.00–16.00 POSTER SESSION:

POSTERS associated with S05 section (FT-S05-1 ÷ FT-S05-7)

M.K. Moskvin, D.A. Sinev

10.00 Mon, June 27 PL-1

See also Plenary presentation:

Ultrashort pulsed laser engineering of biomimetic surfaces and related applications

E.I. Stratakis
Institute of Electronic Structure and Lasers Foundation for Research and Technology Hellas
and Department of Physics University of Crete
Crete, Greece

Surface functionalization and related phenomena (S06)

June 27, 30

Monday, June 27

12.00–18.10 Surface functionalization and related phenomena (S06)

1. Periodic surface structures: formation mechanisms, methods & applications

CHAIRMEN: D. Sinev, V. Makin

12.00 S06-1 **Methods for the formation of computer-generated diffractive structures based on superresolution thermochemical laser writing** (INVITED)

V.P. Korolkov[1], V.P. Veiko[2], D.A. Sinev[2], R.I. Kuts[1], A.G. Sedukhin[1], R.V. Shimansky[1]

[1] IA&E SB RAS, Novosibirsk. Russia

[2] ITMO, St. Petersburg, Russia

12.20 S06-2 **Periodically poled ferroelectric crystals for laser light frequency conversion and diffractive optical elements** (INVITED) **(online)**

V.Ya. Shur[1], A.R. Akhmatkhanov[1], M.A. Chuvakova[1], A.A. Esin[1], O.L. Antipov[2], A.A. Boyko[3], D.B. Kolker[3], V.S. Pavelyev[4]

[1] Institute of Natural Sciences and Mathematics, Ural Federal University, Ekaterinburg, Russia

12.40 S06-3 **The laser source developing trend in accuracy processing (INVITED) (online)**

Zhu Xiao

The national engineering center for laser processing, Huazhong University of Sci.& Tech., China

13.00 S06-4 **About the models for regular surface structures formation on semiconductors under interaction with long duration laser radiation** (INVITED)

V.S. Makin[1], R.S. Makin[2]

[1] Peter the Great St. Petersburg Polytechnic University, Nuclear Energy Institute, Sosnovy Bor, Leningrad Oblast, Russia

"Kometa" corporation – NPC OEKN, Saint-Petersburg, Russia

[2] National Nuclear Research University, MIFI, Moscow, Russia

13.20 S06-5 **Quantitative analysis of the laser-induced periodic surface structures regularity** *S01*

M.K. Moskvin[1], N.A. Afanasev[1], E.V. Prokofev[1], D.A. Belousov[2], V.P. Korolkov[2], D.A. Sinev[1], G.V. Odintsova[1]

[1]ITMO University, St. Petersburg, Russia

[2]Institute of Automation and Electrometry of the SB RAS, Novosibirsk, Russia

13.30 S06-6 **Lateral effects in laser oxidation for thermochemical recording on thin metallic films** *S01*

Quang Dung Nguyen, D.A. Sinev, E.A. Shakhno

ITMO University, St. Petersburg, Russia

13.40 S06-7 **Controlled formation of thermochemical laser-induced surface periodic structures for modern photonic devices**

(INVITED)
D.A. Sinev, G.V.Odintsova, M.K. Moskvin, Ya.M. Andreeva, A.R. Suvorov, N.A. Afanasev, E.V. Prokofev, E.A. Shakhno, V.P.Veiko
ITMO University, St. Petersburg, Russia

14.00 S06-8 **Optimization of scanning thermochemical laser writing of crossed diffractive gratings on circular writing systems**
R.I. Kuts, V.P. Korolkov, A.G. Sedukhin, A.R. Sametov, V.V. Cherkashin, A.I. Malyshev, D.A. Belousov
Institute of Automation and Electrometry SB RAS, Novosibirsk, Russia

14.10 FT-S06-1 **Laser-induced oxidation of titanium: specifics of chemical composition** *S01*
D.A. Rud, D.A. Sinev, D.A. Zuev, E.Y. Ponkratova, A.M. Kuzmichev
ITMO University, St. Petersburg, Russia

14.15 FT-S06-2 **Controlled formation of regular lattices based on thermochemical laser-induced periodic surface structures on titanium thin films** *S01**
A.R. Suvorov, M.D. Vasilev, D.A. Sinev
ITMO University, St. Petersburg, Russia

14.00–15.00 LUNCH TIME

2. Formation mechanisms study, characteristics & applications of surface structures

CHAIRMEN: G. Odintsova, D.S. Polyakov

15.00 S06-9 **Resonant laser printing of photonic metasurfaces - structural colors, metalenses and holograms** (INVITED) (**online**)
Xiaolong Zhu
State Key Laboratory of Precision Spectroscopy, School of Physics and Electronic Science, East China Normal University, Shanghai, China

15.20 S06-10 **Laser functionalization of metal surfaces for different task: from industry to medicine and art** (INVITED)
G.V. Odintsova, V.P.Veiko
ITMO University, St. Petersburg, Russia

15.40 S06-11 **Effect of treatment with nanosecond laser pulses on the fatigue properties and structure of ultrafine-grained titanium** (INVITED) (**online**)
Yu.R. Kolobov [1], S.S. Manokhin [1], A.Yu. Tokmacheva-Kolobova [1], G.V. Odintsova [2]
[1] Institute for Problems of Chemical Physics RAS, Chernogolovka, Moscow region, Russia
[2] ITMO University, St. Petersburg, Russia

16.00 S06-12 **Modeling of writing, erasing and rewriting of colors on titanium surface under the action of pulsed-periodic nanosecond laser**
D.S. Polyakov
ITMO University, St. Petersburg, Russia

16.10 S06-13 **Laser-assisted surface activation for the fabrication of flexible non-enzymatic Cu-based sensors**
I.I. Tumkin[1], E.M. Khairullina[1], K. Ratautas[2], M.S. Panov[1], V.S. Andriianov[1], S. Mickus[2], A.A. Manshina[1], G. Račiukaitis[2]
[1] Institute of Chemistry, Saint Petersburg University, SPbU, St. Petersburg, Russia
[2] Center for Physical Sciences and Technology, Vilnius, Lithuania

16.20 S06-14 **Laser Controlled Wetting of Metal Surfaces for Various Applications** *S01*
N.N. Shchedrina, M. Karsakova, A. Karamyants, D. Zuev, G.V. Odintsova
ITMO University, St. Petersburg, Russia

16.30 S06-15 **Fabrication and investigation of nanopipettes with controlled geometry for scanning ion-conductance**

microscopy (online)
S.Yu. Lukashenko, M.V. Zhukov, I.D. Sapozhnikov, M.L. Felshtyn, O.M. Gorbenko, A.O. Golubok
Institute for Analytical Instrumentation RAS, St. Petersburg, Russia

16.40 FT-S06-3 **Formation by IR laser ablation of amphiphobic teflon surfaces for oil/water separation (online)**
D. Kuznetsov, K. Volchetskaya, M. Kosobokov, V.Ya. Shur
Institute of Natural Sciences and Mathematics, Ural Federal University, Ekaterinburg, Russia

16.45 FT-S06-4 **Protection of metal surfaces from biofouling using nanosecond laser structuring** *S01**
E.A. Davydova, N.N. Shchedrina, A. Peltek, I.A. Filatov, G.V. Odintsova
ITMO University, St. Petersburg, Russia

16.50 FT-S06-5 **Laser nanostructuring of the surface of precious metals** *S01*
D.S. Lutoshina, A.A. Morozova, T.A. Nguen, G.V. Odintsova, M.M. Sergeev
ITMO University, St. Petersburg, Russia

16.55 FT-S06-6 **Features of additive laser processing of the surface layer of titanium samples** *S01*
X.A. Egorova[1], K.A. Rozanov[1], A.I. Kiian[2], D.A. Sinev[1]
[1] ITMO University, St.Petersburg, Russia
[2] INSCIENCE, St.Petersburg, Russia

COFFEE BREAK

3. Laser-assisted formation of surface structures, based on laser ablation & deposition

CHAIRMEN: D. Sinev, D. Polyakov

17.30 S06-16 **Laser-induced formation of microbumps on nickel**
Yu. Pestov [1], V. Makin [2]
[1]Scientific Research Institute for Optoelectronic Instrument Engineering, Sosnovy Bor, Russia
[2]"Kometa" corporation – NPC OEKN, Saint-Petersburg, Russia

17.40 S06-17 **Pulsed Laser Deposition of large-area thin films of second-generation high-temperature superconductors** *S01*
I. Rodionov, A. Bortnyansky, D. Getman, V. Kubasov, A. Mosesov, D. Nikiforov, F. Podtykan, N. Sigitova, A. Yudin
JSC 'NIIEFA', Saint-Petersburg, Metallostroy, Russia

17.50 FT-S06-7 **Laser-induced deposition of copper and nickel from deep eutectic solvents**
A.S. Levshakova[1], E.M. Khairullina[1], A.Yu. Shishov[1], I.I. Tumkin[1]
[1] Institute of Chemistry, St. Petersburg University, SPbU,

St. Petersburg, Russia

17.55 FT-S06-8 **Near-IR pulsed laser-induced copper deposition from deep eutectic solvents for controlled fabrication of microstructures** *S01*
E.A. Avilova[1], D.A. Sinev[1], V.P. Veiko[1], E.A. Eltysheva[1], M.A. Zaikina[1], E.M. Khairullina[1,2], I.I. Tumkin[2], A.Yu. Shishov[2]
[1] ITMO University, Saint Petersburg, Russia
[2] Institute of Chemistry, Saint Petersburg State University, St. Petersburg, Russia

18.00 FT-S06-9 **Laser ablation of porous silicon: effect of target porosity**
M.S. Grigoryeva[1], I.N. Zavestovskaya[1], A.P. Kanavin[1], A.Yu. Kharin[2]
[1] P.N. Lebedev Physical Institute, RAS, Moscow, Russia
[2] National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russia

18.05 FT-S06-10 **Transformation of crystalline copper oxide nanoparticles in colloid produced by laser ablation in water (online)**
V.I. Pryakhina[1], B.I. Lisjikh[1], V. Lebedev[2], S.A.M. Tofail[2], V.Ya. Shur[1]
[1]Institute of Natural Sciences and Mathematics, Ural Federal University, Yekaterinburg, Russia
[2]Bernal Institute, University of Limerick, Ireland

Thursday, June 30

12.00–17.00 Surface functionalization and related phenomena (S06)

4. Laser treatment of dielectrics & semiconductors: physical mechanisms and applications

CHAIRMEN: M. Sergeev, R. Zakoldaev

12.00 S06-18 **From retrospective analysis to mechanism of laser-induced damage in transparent dielectrics** (INVITED) (online)
O. Efimov
Thousand Oaks, California, USA

12.20 S06-19 **Nanoscale 3D printing of functional structures using blended resin mixtures with micro/nanojoining of metallic nanowires** (INVITED) (online)
Yong Feng Lu[1], Ying Liu[1], Wei Xiong[1], Peixun Fan[1], Aofei Mao[1], Jean-François Silvain[2]
[1] Department of Electrical and Computer Engineering, University of Nebraska-Lincoln, Lincoln, USA
[2] Institut de Chimie de la Matière Condensée de Bordeaux, Avenue du Docteur Albert Schweitzer, Pessac Cedex, France

12.40 S06-20 **$CsPbBr_3$ deposited by laser ablation as indirect detector of**

ionizing radiation (INVITED) (**online**)
A.P. Caricato
Department of Mathematics and Physics "Ennio De Giorgi"- University of Salento and INFN (National Institute of Nuclear Physics), Lecce, Italy

13.00 S06-21 **Laser synthesis of long linear carbon chains** (INVITED)
A. Kucherik[1], S. Kutrovskaya[1,2], A. Osipov[1], V. Samyshkin[1], A. Abramov[1], A. Povolotskiy[3]
[1] Department of Physics and Applied Mathematics, Stoletov Vladimir State University, Vladimir, Russia
[2] Skolkovo Institute of Science and Technology, Moscow, Russia
[3] Institute of Chemistry, St. Petersburg State University, St. Petersburg, Russia

13.20 S06-22 **Mass customization of flow chemistry reactors and microfluidic chips using femtosecond laser micromachining** (INVITED) **(online)**
Ya Cheng
East China Normal University, Shanghai, China

13.40 S06-23 **Laser irradiation influence on the semiconductor films for its multi-functional application** (INVITED)
M.M. Sergeev, V.R. Gresko, A.A. Olkhova, A.D. Dolgopolov, Ya.M. Andreeva
ITMO University, St. Petersburg, Russia

14.00 S06-24 **Laser-based functionalisation of microsystems** (INVITED) **(online)**
J. V. Wochnowski
Technische Hochschule, Lübeck, Germany

14.00–15.00 LUNCH TIME

5. Microoptical components fabrication based on direct & laser-induced micro plasma action

CHAIRMEN: M.M. Sergeev, R. Zakoldaev

15.00 FT-S06-11 **Laser-induced modification of ZnO thin films properties for optoelectronic application** *S01*
V.R.Gresko, M.M. Sergeev, V.V. Smirnova, A.D. Dolgopolov
ITMO University, Saint Petersburg, Russia

15.05 FT-S06-12 **Investigation of conditions for laser-plasma recording of micro-optical elements arrays in glass** *S01*
A.A. Boloshko, V.S. Rymkevich, M.I. Egorova, M.M. Sergeev
ITMO University, St. Petersburg, Russia

15.10 FT-S06-13 **Influence of factors controlling surface microgeometry of fused silica during fabrication of multisector binary phase plates by laser-induced microplasma on functioning quality**

		S01 *G.K. Kostyuk[1], D.S. Stepanyuk[1], A.A. Petrov[1], V.A. Shkuratova[1], O.S. Vasilev[2]* [1] ITMO University, St. Petersburg, Russia [2] Laser center LLC, St. Petersburg, Russia
15.15	FT-S06-14	**Multisector binary phase plates on fused silica for generation of scalar vortex beams** *S01* *G.K. Kostyuk, V.A. Shkuratova, A.A. Petrov, D.S. Stepanyuk* ITMO University, St. Petersburg, Russia
15.20	FT-S06-15	**Laser color patterning of glass material: comparison between laser induced film transfer in air and in vacuum** *S01* *A. Ramos-Velazquez, A.A. Lebeko, R.A. Zakoldaev, V.P.Veiko* ITMO University, St.Petersburg, Russia
15.25	FT-S06-16	**Laser-inducted modification of the PbSe chalcogenide film photosensitivity** *S01* *A.A. Olkhova, A.A. Patrikeeva, M.M. Sergeev* ITMO University, St. Petersburg, Russia
15.30	FT-S06-17	**The fabrication processes and simple micro-cavity size adjustment of fiber Mach-Zehnder interferometer by laser-induced micro-plasma** *S01* *Cai Shuhao[1,2], M. Sergeev[1], A. Petrov[1], S. Varzhel[1], Li Li[2]* [1]ITMO University, St. Petersburg, Russia [2]School of Electronic and Optical Engineering, Nanjing University of Science and Technology, Nanjing, China
15.35	FT-S06-18	**Fused silica processing by laser induced microplasma: pulse duration influence** *S01* *V.S. Rymkevich, A.A. Boloshko, M.M. Sergeev* ITMO University, Saint Petersburg, Russia
15.40	FT-S06-19	**Spiral phase plates for generation of scalar vortex beams made on fused silica by laser-induced microplasma** *S01* *G.K. Kostyuk, V.A. Shkuratova, A.A. Petrov, D.S. Stepanyuk* ITMO University, St. Petersburg, Russia
15.45	FT-S06-20	**Fabrication of microfluidic channels in quartz glass by laser-induced plasma** *S01** *M.A. Dubkova, M.M. Sergeev* ITMO University, St. Petersburg, Russia
15.50	FT-S06-21	**CO_2-laser glass structuring: development of microfluidic elements** *S01** *A.G. Bondarenko, R.A. Zakoldaev* ITMO University, St. Petersburg, Russia
15.55	FT-S06-22	**Effect of molybdenum doping on photo-induced changes in glassy As_2S_3** *E.V. Kapustina[1], V.R. Gresko[1], M.M. Sergeev[1], V.P. Veiko[1], M.*

Krbal[2], S.I. Nesterov[3], P.S. Provotorov[4], A.V. Kolobov[4]
[1] ITMO University, Saint Petersburg, Russia
[2] University of Pardubice, Pardubice, Czech Republic
[3] A.F. Ioffe Physico-Technical institute, Saint Petersburg, Russia
[4] Herzen State Pedagogical University of Russia, Saint Petersburg, Russia

16.00 – 17.00 POSTER SESSION:

POSTERS associated with S06 section: (FT-S06-1 ÷ FT-S06-22)

CHAIRMEN: M.K. Moskvin, D.A. Sinev

See also Plenary presentations:

10.30 Mon, June 27 PL-2 **Photoconductive terahertz antennas generation in nitrogen-doped diamond materials** (INVITED)
V.I. Konov, P.A. Chizhov, M.S. Komlenok, V.V. Kononenko, V.V. Bukin, A.A. Ushakov, V.V. Bulgakova, A.A. Khomich, A.P. Bolshakov, S.V. Garnov
General Physics Institute RAS, Moscow, Russia

10.30 Thu, June 30 PL-8 **Laser technologies for perovskite photonics and optoelectronics**
S.V. Makarov
ITMO University, St. Petersburg, Russia

11.00 Thu, June 30 PL-9 **Functional chalcogenide semiconductors in optoelectronics and photonics**
A.V. Kolobov
Department of Physical Electronics, Institute of Physics, Herzen State Pedagogical University of Russia, St. Petersburg, Russia

“Industrial Application of Lasers" (S07)

June 30

THURSDAY, June 30

12.00–16.00 **Industrial Applications of Lasers (S07)**

CHAIRMEN: S.G. Gorny, I.N. Fomenko

12.00 S07-1 **Development of Laser Additive Technologies (INVITED) (online)** (in Russian)
A.G. Grigoryants, D.S. Kolchanov, A.A. Drenin
N.E. Bauman Moscow State Technical University, Moscow, Russia

12.20 S07-2 **Development of technological regimes and equipment for pilot tests for mechanical, thermal and chemical stability of laser-induced identification codes on the surface of structural and functional materials (online)** (in Russian)
Yu.R. Kolobov [1], S.S. Manokhin [1], V.P. Veiko [2], I.V. Nelasov [1], A.Yu. Tokmacheva-Kolobova [1], G.V. Odintsova [2]
[1]Institute for Problems of Chemical Physics, RAS, Chernogolovka, Moscow region, Russia
[2] ITMO University, St. Petersburg, Russia

12.30 S07-3 **Investigation of the physical mechanisms of laser cleaning of the surface of hot-rolled metal from mill scale under the influence of continuous laser radiation with a wavelength of 1.06 microns** *S01*(in Russian)
D.V. Zhurba, A.A. Petrov
ITMO University, St-Petersburg, Russia

12.40 S07-4 **Development of laser technological complexes: experience in developing and supplying of complex laser systems** (in Russian)
D. Sachenko
Leningrad Laser Systems, St. Petersburg, Russia

12.50 S07-5 **Laser high-precision cleaning: from idea to final result** (in Russian)
M. Yarchuk
LLC LaserЪ, St. Petersburg, Russia

13.10 S07-6 **The use of laser systems in the processing of materials in the microelectronic industry** (in Russian)
O. Vasiliev
Laser Center, St. Petersburg, Russia

13.20 S07-7 **Current and prospective industrial applications of femtosecond lasers** (in Russian)
M. A. Konyashchenko
Avesta Project Ltd, St. Petersburg, Russia

13.30 FT-S07-1 **Digital rainbow hologram synthesis on the surface of stainless steel** *S01* (in Russian)
E.V. Prokofiev, M.K. Moskvin, N.A. Afanasev, J. Bi, D.A. Sinev,

G.V. Odintsova
ITMO University, St. Petersburg, Russia

13.35 FT-S07-2 **Enhancing of mechanical properties of convex reliefs fabricated on metal surfaces by laser irradiation** *S01* (in Russian)
J.V. Amiaga, A. Ramos-Velazquez, A.F. Igolkin
ITMO University, St. Petersburg, Russia

13.40 FT-S07-3 **Laser modification of the cranial implants surface to reduce their roughness after 3D printing** *S01* (in Russian)
K. Mikhailova, E. Lovushkina, V. Romanov, Yu. Karlagina, G.V. Odintsova
ITMO University, St. Petersburg, Russia

13.45 FT-S07-4 **Application of color laser marking technology in barcoding** *S01* (in Russian)
V.V. Romanov, G.V. Odintsova, I.A. Konyakhin, Xiangyu Sun
ITMO University, St. Petersburg, Russia

13.50 FT-S07-5 **Laser marking of polymer composites based on PVC with a biodegradable additive** *S01* (in Russian)
U. Gabysheva, G. Odintsova, M. Sergeev, M. Uspenskaya, E. Samuylova
ITMO University, St. Petersburg, Russia

13.55 FT-S07-6 **Angular and spectral selectivity of temperature noncritical pockels cell based on single KTP crystal** *S01* (in Russian)
J.R. Istamgulova [1], S.V. Gagarskiy [1], S.G. Grechin [2], P.Y. Druzhinin [3], A.N. Sergeev [1]
[1] ITMO University, St-Petersburg, Russia
[2] Prokhorov General Physics Institute of the RAS, Moscow, Russia
[3] Photon energy GmbH, Ottensoos, Germany

14.00 FT-S07-7 **Influence of laser structuring on the corrosion resistance of AISI 304 stainless steel** *S01* (in Russian)
V.M. Prokopiev[1], N.N. Shchedrina[1], I.A. Filatov[1], G.V. Odintsova[1], V.A. Vorkel[2], R.I. Bogdanov[2]
[1] ITMO University, St. Petersburg, Russia
[2] National Research Nuclear University MEPhI

14.05 FT-S07-8 **Application of laser films for marking machine-building parts (online)** (in Russian)
E.Yu. Troshina, E.I. Pryakhin
Saint Petersburg Mining University, St Petersburg, Russia

14.00–15.00 LUNCH TIME

15.00 – 16.00 POSTER SESSION:

POSTERS associated with S07 section (FT-S07-1 ÷ FT-S07-8)

CHAIRMEN: M.K. Moskvin, D.A. Sinev

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Моделирование изделий в среде olidorks

03

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