

11th International Interdisciplinary Seminar on Mathematical Models and Modeling in Laser-Plasma Processes and Advanced Science Technologies

LPpM³ - 2013
Montenegro, Budva

Dear colleagues!

XI-th International Seminar LPpM3-XI will be held in Montenegro, Budva, from 14.09 to 21.09 2013. The seminar will be combined with the International Conference **ALT'13** (Advanced Laser Technologies - 2013). Seminar participants may participate in **ALT'13** by presenting their results in the form of posters that must be sent to Organizing Committee with a mark "ALT'13"

M.V.Keldysh Institute of Applied Mathematics of RAS, A.M.Prokhorov Institute of General Physics of RAS and University of Montenegro hold the Tenth International Interdisciplinary Seminar. There two sections will work at the seminar:

- Section of mathematical models and modeling in laser-plasma processes
- Section of mathematical modeling in advanced science technologies.

Each session of a seminar will include the invited reports in the form of lectures.

Contents of the Seminar:

Section I

- Applying of mathematical modeling in a rapidly growing and advancing domain of highly non-equilibrium laser-plasma processes.
- Critical analysis of applied mathematical models and modeling results.
- Experimental investigations and comparative analysis of its data with modeling results.
- Analysis of applied and developed software.

Section II

- Examples of application of mathematical modeling in the humanitarian and economic studies.

Saturday, September 14	
11.00-20.00	Registration, Check-in at Hotel “Slovenska plaza”
Sunday, September 15	
10.00-17.00	Registration, Check-in at Hotel “Slovenska plaza”
Monday, September 16	
10.30-11.00	Opening ceremony
10.30-11.00	Prof. Dr. sc. Nat. V.I. Mazhukin, Chair XI Workshop. The goals and objectives of the workshop
INVITED PRESENTATION	
11.00-11.30	Invited Presentation V.I. Mazhukin Atomistic and continuum approaches to modeling the kinetics and dynamics of fast phase transitions induced by ultrashort laser pulses <i>Keldysh Institute of Applied Mathematics of RAS Moscow, Russia</i>
11.30-12.00	Coffee break
12.00-12.30	Invited Presentation S.G. Garanin The numerical simulation of the wide-aperture adaptive mirror control on the luch laser facility based on the stochastic parallel gradient algorithm <i>FSUE RFNC - VNIIEF, Sarov, Nizhny Novgorod region, Russia</i>
12.30-13.00	Plenary Presentation S.S. Alimpiev Novel approaches in laser assisted mass spectrometry of organic compounds <i>A.M. Prokhorov General Physics Institute of RAS Moscow, Russia</i>
13.00-14.00	Lunch time
14.00-14.30	Invited Presentation V.I. Mazhukin ¹ , A.V. Shapranov ¹ , A.A. Samokhin² , A.Yu. Ivochkin ² Molecular dynamic calculation of non-equilibrium liquid vapor phase transition during sub-nanosecond homogeneous thin film heating ¹ <i>M.V. Keldysh Institute of Applied Mathematics, RAS, Moscow, Russia</i> ² <i>A.M. Prokhorov General Physics Institute, RAS, Moscow, Russia</i>

14.30-15.00	<p>Invited Presentation B.N. Chichkov Laser generation and printing of nanoparticles <i>Laser Zentrum Hannover, Germany</i></p>
ORAL PRESENTATION	
15.00-15.15	<p>Oral Presentation O.G.Tsarkova Self-oscillating processes during the laser ablation of construction material <i>A.M. Prokhorov General Physics Institute of RAN, Moscow, Russia</i></p>
15.15-15.30	<p>Oral Presentation R.A. Shnyagin The numerical modeling of adaptive optical system of the UFL-2M powerful laser facility at various configurations <i>FSUE RFNC - VNIIEF, Sarov, Nizhny Novgorod region, Russia</i></p>
15.30-15.45	<p>Oral Presentation F.A. Starikov The numerical simulation of the automatic alignment procedure of amplifier section of the ufl-2m powerful laser facility using the stochastic gradient algorithm <i>FSUE RFNC - VNIIEF, Sarov, Nizhny Novgorod region, Russia</i></p>
15.45-16.00	<p>Oral Presentation V. M. Brendel¹, T. F. Yagafarov¹, S. V. Garnov¹, V.A. Terechin², U.A. Trutnev² PLD grown thin films stoichiometry and structure study ¹<i>A.M. Prokhorov General Physic Institute of RAS, , Moscow, Russia</i> ²<i>FSUE RFNC - VNIIEF, Sarov, Nizhny Novgorod region, Russia</i></p>
16.00-16.30	Coffee break
16.30-16.45	<p>Oral Presentation V.V. Bukin, P.A. Chizhov, S.V. Garnov Pump-probe interferometry of femtosecond laser plasma <i>A.M. Prokhorov General Physic Institute of RAS, Moscow, Russia</i></p>

16.45-17.00	<p>Oral Presentation</p> <p>S.P. Sadovskiy, A.A.Sirotkin, S.V.Garnov</p> <p>Tunable two-frequency σ-polarized Nd:YVO₄-YVO₄ laser</p> <p><i>A.M. Prokhorov General Physic Institute of RAS, Moscow, Russia</i></p>
17.15- 17.30	<p>Oral Presentation</p> <p>P.A. Chizhov, V.V. Bukin, S.V. Garnov</p> <p>Electron density dynamics of femtosecond filament plasma channel in gases</p> <p><i>A.M. Prokhorov General Physic Institute of RAS, Moscow, Russia</i></p>
17.30-17.45	<p>Oral Presentation</p> <p>T. V. Dolmatov, V. V. Bukin, O. T. Loza, D. K. Ul'yanov</p> <p>Electro-optic system for time dependent detection of electrical field of high-power microwave nanosecond pulses</p> <p><i>A.M. Prokhorov General Physic Institute of RAS, Moscow, Russia</i></p>
18.00-18.30	<p>Invited Presentation</p> <p>М.В. Михайлюк</p> <p>Моделирование огня и дыма в видео тренажерных комплексах</p> <p><i>Научно-исследовательский институт системных исследований РАН, Москва, Россия</i></p>
Tuesday, September 17	
INVITED PRESENTATION	
10.00-10.30	<p>Invited Presentation</p> <p>A.G. Kaptilniy¹, A.A. Karabutov², D.M. Ksenofontov²</p> <p>Temperature measurement of high energy states of metal and graphite induced by laser pulse</p> <p>¹<i>Joint Institute for High Temperatures, RAS, Moscow, Russia</i> ²<i>International Laser Center, Moscow State University, Moscow, Russia</i></p>
10.30-11.00	<p>Invited Presentation</p> <p>M.P. Galanin, V.V. Lukin, V.M. Chechetkin, K.L. Shapovalov</p> <p>Mathematical simulation of radiation accelerated outflows</p> <p><i>M.V. Keldysh Institute for Applied Mathematics of RAS, Moscow, Russia</i></p>

11.00-11.30	<p>Invited Presentation</p> <p>Potapenko I.F.</p> <p>Modeling of nonuniform heating of laser-produced plasmas by Dsmc-based method</p> <p><i>M.V. Keldysh Institute for Applied Mathematics of RAS, Moscow, Russia</i></p>
11.30-12.00	Coffee break
12.00-12.30	<p>Invited Presentation</p> <p>Povarnitsyn M.E., Fokin V.B., Levashov P.R., Khishchenko K.V.</p> <p>Comparison of continuum and molecular dynamics approaches for simulation of laser ablation of metals</p> <p><i>Joint Institute for High Temperatures, RAS, Moscow, Russia</i></p>
ORAL PRESENTATION	
12.30-12.45	<p>Oral Presentation</p> <p>E.V. Zavedeev, V.V. Kononenko, V.I. Konov</p> <p>Experimental and numerical study of fs laser pulse propagation through C - Si bulk</p> <p><i>A.M. Prokhorov General Physics Institute of RAS, Moscow, Russia</i></p>
12.45-13.00	<p>Oral Presentation</p> <p>Н. Михалевич</p> <p>Асимптотика собственных значений оператора типа Штурма-Лиувилля с переменным запаздыванием</p> <p><i>Университет Черногории, Морской факультет, Котор, Черногория</i></p>
13.00-14.00	Lunch time
14.00-14.10	<p>Oral Presentation</p> <p>П.А. Образцов¹, П.А. Чижов¹, Ю.П. Свирко², С.В. Гарнов¹</p> <p>Взаимодействие лазерного излучения с графеном и наноструктурами на его основе</p> <p>¹<i>Институт общей физики им. А.М. Прохорова, РАН, Москва, Россия</i> ²<i>Университет Восточной Финляндии, Йоенсуу, Финляндия</i></p>
14.10-14.20	<p>Oral Presentation</p> <p>I.F. Potapenko</p> <p>Dsmc modeling of electron heating for the nonlinear collision kinetic</p>

	<p>equation with quasilinear diffusion</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Russia</i></p>
14.20-14.30	<p>Oral Presentation</p> <p>O.N. Koroleva, A.V. Mazhukin</p> <p>Non-equilibrium melting and evaporation of silicon under the influence of ultra-short laser pulse</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Russia</i></p>
14.30-14.40	<p>Oral Presentation</p> <p>T.V. Koroleva¹, O.N. Koroleva², A.V. Mazhukin², A.V. Shapranov²</p> <p>The impact of inflation on the effectiveness of the project</p> <p>¹<i>Moscow University for the Humanities, Russia</i> ²<i>M.V. Keldysh Institute of Applied Mathematics of RAS, Russia</i></p>
14.40-14.50	<p>Oral Presentation</p> <p>V.I. Mazhukin¹, A.V. Shapranov¹, A. V. Rudenko²</p> <p>Comparative study of interatomic potentials for crystalline silicon</p> <p>¹<i>M.V. Keldysh Institute of Applied Mathematics of RAS, Russia, Moscow,</i> ²<i>Moscow institute of physics and technology, State University, Russia, Moscow</i></p>
14.50-15.00	<p>Oral Presentation</p> <p>V.I. Mazhukin, M.M. Demin, A.V. Shapranov</p> <p>An approach to modeling in a continuum model of a homogeneous melt Al film induced by an ultrashort laser pulse</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Russia</i></p>
15.00-15.10	<p>Oral Presentation</p> <p>V.I. Mazhukin, A.V. Shapranov</p> <p>Molecular Dynamics Modeling of the Heterogeneous Melting/Crystallization of Aluminium</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of the RAS, Russia</i></p>
15.10-15.20	<p>Oral Presentation</p> <p>Jancic Rasovic Sanja</p> <p>Composition hyperrings</p> <p><i>Department of Mathematics, Faculty of Natural Science and Mathematics, University of Montenegro</i></p>

15.20-15.30	<p>Oral Presentation</p> <p>Л.И. Галанина</p> <p>Моделирование структуры нейтронной периферии ядер лития и бериллия</p> <p><i>НИИЯФ им. Д.В. Скобельцына МГУ</i></p>
	15.40-16.00 Discussion
16.00-16.30	Coffee break
	17:00 – 18:30 POSTER SECTION ALT-13
1	<p>LM-P-1 <i>Mathematical simulation of radiation accelerated outflows</i></p> <p>M.P. Galanin, V.V. Lukin, V.M. Chechetkin, K.L. Shapovalov (Russia)</p>
2	<p>LM-P-2 <i>PLD grown thin films stoichiometry and structure study</i></p> <p>V.M. Brendel, T.F. Yagafarov, S.V. Garnov, V.A. Terechin, U.A. Trutnev (Russia)</p>
3	<p>LM-P-9 <i>Melting and evaporation of silicon by a picosecond laser pulse.</i></p> <p>O.N. Koroleva, A.V. Mazhukin (Russia)</p>
4	<p>LM-P-14 <i>Modeling of the process of homogeneous melting of aluminum.</i></p> <p>V.I. Mazhukin, M.M. Demin, A.V. Shapranov (Russia)</p>
5	<p>LM-P-19 LM-P-13 <i>Modeling of thin film explosive boiling — heating rate effect</i></p> <p>V.I. Mazhukin, A.V. Shapranov, A.A. Samokhin, A.Yu. Ivochkin (Russia)</p>
6	<p>LM-P-24 <i>Laser ablation of a constructive material – estimation of unknown characteristics of the material and the ablation plume</i></p> <p>O.G. Tsarkova, V.B. Tsvetkov, A.A. Rukhadze, S.V. Garnov (Russia)</p>
7	<p>LM-P-23 <i>Analysis of laser ablation of kevlar</i></p> <p>O.G. Tsarkova, V.B. Tsvetkov, S.V. Garnov (Russia)</p>
	Wednesday, September 18
08.00-20.00	Social program
	Thursday, September 19
	INVITED PRESENTATION
10.00-10.30	<p>Invited Presentation</p> <p>V.G.Novikov¹, K.N.Koshelev², V.V.Ivanov², I.Y.Vichev¹, A.S.Grushin¹, V.V.Medvedev²</p> <p>Modeling of plasma short wavelength source for nanolithography</p> <p>¹<i>M.V. Keldysh Institute of Applied Mathematics of RAS, Moscow, Russia</i></p>

	² <i>Institute of spectroscopy, Troitsk, Russia</i>
10.30-11.00	<p>Invited Presentation</p> <p>И.В. Попов</p> <p>Метод адаптивной искусственной вязкости решения уравнений газовой динамики на неструктурированных треугольных и тетраэдральных сетках</p> <p><i>Институт прикладной математики им. М.В.Келдыша РАН, Москва, Россия</i></p>
11.00-11.30	<p>Invited Presentation</p> <p>V.I. Mazhukin, M.M. Demin, A.V. Shapranov , V.E. Perezhigin</p> <p>Electron Pressure in the Problem of Femtosecond Laser Heating of Metals</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Moscow, Russia</i></p>
11.30-12.00	Coffee break
ORAL PRESENTATION	
12.00-12.15	<p>Oral Presentation</p> <p>N.N. Svetushkov</p> <p>The strings method in a numerical simulation of laser treatment</p> <p><i>Moscow Aviation Institute (National Research University), Moscow, Russia</i></p>
12.15-12.30	<p>Oral Presentation</p> <p>P.V. Breslavskii</p> <p>Dynamically adapting grids for gas-dynamic problems with artificial viscosity</p> <p><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Moscow, Russia</i></p>
12.30-12.45	<p>Oral Presentation</p> <p>Жуковский М.Е., Марков М.Б., Подоляко С.В., Усков Р.В.</p> <p>Математическое моделирование генерации тормозного излучения электронным пучком ускорителя</p> <p><i>Институт прикладной математики им. М.В.Келдыша РАН, Москва, Россия</i></p>
13.00-14.00	Lunch time

14.00-14.15	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">A. Galanina, A. Favorskii</p> <p style="text-align: center;">Local two-dimensional perturbations evolution in small conductivity gas flow in magnetic field</p> <p style="text-align: center;"><i>M.V. Lomonosov Moscow State University, Moscow, Russia</i></p>
14.15-14.30	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">V.O. Podryga, T.A. Kudryashova, S.V. Polyakov</p> <p style="text-align: center;">3D molecular dynamic simulation of gas mixture properties</p> <p style="text-align: center;"><i>M.V. Keldysh Institute of Applied Mathematics of RAS, Moscow, Russia</i></p>
14.30-14.45	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">В.Ю. Глозов¹, В.М. Головизнин¹, С.А. Карабасов², А.П. Маркештейн²</p> <p style="text-align: center;">Математическое моделирование задач флуктуационной гидродинамики с использованием алгоритмов следующего поколения</p> <p style="text-align: center;">¹<i>ИБРАЭ РАН, Москва, Россия</i> ²<i>School of Engineering and Materials Science Queen Mary University of London</i></p>
14.45-15.00	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">А. С. Болдарев, В. А. Гасилов</p> <p style="text-align: center;">Решение больших задач математической физики на суперкомпьютерах: использование расчетных сеток сложной структуры</p> <p style="text-align: center;"><i>Институт Прикладной Математики им. М. В. Келдыша РАН, Москва, Россия</i></p>
15.00-15.15	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">И.А. Короткин, В.М. Головизнин</p> <p style="text-align: center;">Новый беспараметрический вычислительный метод прямого моделирования термоконвективных течений в замкнутой области в форме параллелепипеда</p> <p style="text-align: center;"><i>Институт проблем безопасного развития атомной энергетики РАН, Москва, Россия</i></p>

15.15-15.30	<p style="text-align: center;">Oral Presentation</p> <p style="text-align: center;">Березин А.В., Крюков А.А., Марков М.Б.</p> <p style="text-align: center;">Математическое моделирование электромагнитного поля в задачах с выделенным фронтом ионизации</p> <p style="text-align: center;"><i>Институт прикладной математики им. М.В.Келдыша РАН, Москва, Россия</i></p>
15.30-16.00	<p style="text-align: center;">Coffee break</p>
ROUND-TABLE DISCUSSION	
16.00-17.00	<p style="text-align: center;">Invited Presentation</p> <p style="text-align: center;">A.A. Samokhin</p> <p style="text-align: center;">Academic history and ras reformation</p> <p style="text-align: center;"><i>A.M. Prokhorov General Physics Institute of RAS, Moscow, Russia</i></p>
Friday, September 20	
SECTION: MATHEMATICAL MODELING IN ADVANCED SCIENCE TECHNOLOGIES	
INVITED PRESENTATION	
10.00-10.25	<p style="text-align: center;">Invited Presentation</p> <p style="text-align: center;">Жарко Павичевич</p> <p style="text-align: center;">Одно математическое рассмотрение покупки и продажи</p> <p style="text-align: center;"><i>Университет Черногории, Подгорица, Черногория</i></p>
10.25-10.50	<p style="text-align: center;">Invited Presentation</p> <p style="text-align: center;">Vesna Vujacic¹, Nikolic Aleksandar², Nikolic Emilija³</p> <p style="text-align: center;">Analysis and modeling of morphological and productive characteristics of species of the genus amaranthus L</p> <p style="text-align: center;">¹<i>University of Montenegro, Faculty of Tourism and Hotel management, Kotor, Montenegro</i></p> <p style="text-align: center;">²<i>University of Montenegro, Faculty of Maritime Studies, Kotor, Montenegro</i></p> <p style="text-align: center;">³<i>University of Montenegro, Faculty of Applied Phisiotherapy, Igalo, Montenegro</i></p>

10.50-11.15	<p>Invited Presentation</p> <p>Nenad Kuzmanovic</p> <p>Математические понятия в сказках, легендах и баснях</p> <p><i>Elementary school, Lipik, Croatia</i></p>
11.15-11.40	<p>Invited Presentation</p> <p>Marijan Marković</p> <p>Harmonic functions and the hyperbolic metric</p> <p><i>Faculty of Natural Sciences and Mathematics, University of Montenegro Podgorica, Montenegro</i></p>
11.40-12.00	Coffee break
12.00-12.25	<p>Invited Presentation</p> <p>Dušan Jokanović, Marina Zirojević</p> <p>Using „Wolfram Mathematica 9.0“ to simulate probability problems</p> <p><i>University of East Sarajevo, Production and Management Faculty Trebinje</i></p>
12.25-12.50	<p>Invited Presentation</p> <p>T.V. Koroleva¹, O.N. Koroleva², M.M. Demin², P.V. Breslavskii²</p> <p>Effect of reinvestment of income for the project rate of return</p> <p>¹<i>Moscow Univesity for the Humanities, Russia</i></p> <p>²<i>M.V. Keldysh Institute of Applied Mathematics of the RAS, Russia</i></p>
13.00-14.00	Lunch time
14.00-14.25	<p>Invited Presentation</p> <p>K.V. Khishchenko</p> <p>Models of thermodynamic properties and phase transitions of materials under intense laser influences</p> <p><i>Joint Institute for High Temperatures RAS, Moscow, Russia</i></p>
14.25-14.50	<p>Invited Presentation</p> <p>Н.Л. Богуш, Г.В. Порядин, Ж.М. Салмаси, Л.Ю. Семенова, С.Г. Скуратовская, Т.Ю. Ручинская, Г.П. Щелкунова</p> <p>Механизмы развития шоковых состояний</p> <p><i>ГБОУ ВПО РНИМУ им Н.И.Пирогова Минздрава России, Москва</i></p>
14.50-15.15	<p>Invited Presentation</p> <p>В.М. Чечеткин</p> <p>Теория джетов</p>

	<i>Институт прикладной математики им. М.В.Келдыша РАН, Москва, Россия</i>
SUMMING. CLOSING OF SEMINAR.	
Saturday, September 21	
10.00-13.00	Departure