

Program
21st International Workshop
on Magneto-Plasma Aerodynamics
 April 26-28, 2022

| April 26 (Tuesday) | |
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| 09:15-09:30 | REGISTRATION On-line connection for nonresident and foreign participants |
| 09:30-09:40 | OPENING, Valentin Bityurin |
| 09:40-10:50 | SESSION 1. ELECTRICAL DISCHARGES - 1 Chairman Valentin Bityurin |
| 09:40-10:00 | 1.1 Filamentation Mechanism of Nanosecond Surface Barrier Discharge in Nitrogen , Soloviev V.R. (MIPT, Dolgoprudny, Moscow Region, Russia) |
| 10:00-10:20 | 1.2 The energy input in a dielectric barrier discharge with special waveform power supply , <u>A. Dyachenko</u> ¹ , I. Iov ² , O. Stepanova ¹ , M. Pinchuk ¹ (¹ Institute for Electrophysics and Electric Power, ² SPbSU, Saints-Petersburg, Russia) |
| 10:20-10:40 | 1.3 The development of SDBD in the presence of oxide on the electrodes , <u>I. Selivonin</u> ¹ , S. Kuvardin ^{1,2} , I. Moralev ¹ (¹ JIHT RAS, Moscow, ² MIPT, Dolgoprudny, Moscow Region, Russia) |
| 10:40-11:00 | 1.4 Plasma rotation velocity in reflex discharge with thermionic cathode , <u>A.P. Oiler</u> ^{1,2} , G.D. Liziakin ¹ , A.V. Gavrikov ^{1,2} (¹ JIHT RAS, Moscow, ² MIPT, Dolgoprudny, Moscow Region, Russia) |
| 11:00-11:20 | COFFEE BREAK |
| 11:20-13:00 | SESSION 2. ELECTRICAL DISCHARGES - 2 Chairman Alexander Firsov |
| 11:20-11:40 | 2.1 Investigation of thermal expansion wave appearance and interaction caused by interelectrode pulse discharge at different medium pressure , Yu.V. Dobrov, I.Ch. Mashek, V.A. Lashkov, <u>M.E. Renev</u> , P.S. Khoronzhuk (SPbSU, Saints-Petersburg, Russia) |
| 11:40-12:00 | 2.2 Transformation of condensed matter into a low-temperature plasma flow for problems of plasma mass separation with a potential well , <u>N.N. Antonov</u> ¹ , R.A. Usmanov ¹ , G.D. Liziakin ¹ , S.B. Vetrova ^{1,2} , L.S. Volkov ^{1,2} , A.D. Melnikov ¹ , A.V. Gavrikov ¹ , V.P. Smirnov ¹ (¹ JIHT RAS, Moscow, ² MIPT, Dolgoprudny, Moscow Region, Russia) |
| 12:00-12:20 | 2.3 Phenomenology of high-current discharge in nitrogen at medium pressures in the rail geometry of electrodes , Yu. Akishev ^{1,2} , V. Karalnik ¹ , <u>A. Petryakov</u> ¹ (¹ SRC RF TRINITI, Troitsk, ² NRNU MEPhI, Moscow, Russia) |
| 12:20-12:40 | 2.4 Emission of chalcogens in the pulsed gas discharge , <u>S.V. Avtaeva</u> ¹ , A.A. Heneral ² (¹ ILP SB RAS, Novosibirsk, Russia; ² Institute of Electron Physics, NAS of Ukraine, Uzhhorod, Ukraine) |
| 12:40-13:00 | 2.5 CO₂ conversion in microwave and radio-frequency driven atmospheric-pressure plasma jets , <u>N. Babaeva</u> ¹ , G. Naidis ¹ , D. Tereshonok ¹ , T. Chernishev ¹ , L. Volkov ¹ , S. Wilczek ² , Y. Liu ² , T. Mussenbrock ² (¹ JIHT RAS Moscow, Russia ² Ruhr University, Bochum, Germany) |
| 13:00-14:00 | LUNCH |

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| 14:00-15:40 | SESSION 3. PLENARY Chairman Ivan Moralev |
| 14:00-14:30 | 3.1 Kinetic processes during ultracold plasma expansion , <u>B.B. Zelener</u> ^{1,2} , S.Y. Bronin ¹ , E.V. Vilshanskaya ¹ , E.V. Vikhrov ¹ , K.P. Galstyan ^{1,2} , N.V. Morozov ^{1,2} , S.A. Saakyan ¹ , V.A. Sautenkov ¹ , B.V. Zelener ¹ (¹ JIHT RAS, ² NRNU "MEPhI" Moscow, Russia) |
| 14:30-15:00 | 3.2 Relaxation of electronic excitation and fast gas heating in nanosecond plasma of nitrogen-oxygen mixtures , <u>N.A. Popov</u> ¹ , S.M. Starikovskaya ² (¹ Skobeltsyn NRINP MSU, Moscow, Russia, ² Laboratoire de Physique des Plasmas (LPP), CNRS, Sorbonne Université, Université Paris-Saclay, Observatoire de Paris, PSL University, Ecole polytechnique, Institut Polytechnique de Paris, France) |
| 15:00-15:30 | 3.3 Capillary discharge: physics and application , A.S. Pashchina (JIHT RAS Moscow, Russia) |
| 15:30-16:00 | 3.4 High-voltage NS discharge interaction with fs-laser generated blast waves: Gasdynamic diode , <u>A. Starikovskiy</u> , A. Dogariu, M. Shneider (Princeton University, USA) |
| 16:00-16:20 | COFFEE BREAK |
| 16:20-18:00 | SESSION 4. ELECTRICAL DISCHARGES - 3 Chairman Pavel Kazanskiy |
| 16:20-16:40 | 4.1 Longitudinal DC discharge in a supersonic flow, part 1: 2D numerical simulation , <u>A.A. Firsov</u> , D.A. Tarasov, V.A. Bityurin, A.S. Dobrovolskaya, A.N. Bocharov (JIHT RAS, Moscow, Russia) 4.2 Longitudinal DC discharge in a supersonic flow, part 2: experimental investigation , <u>A.A. Firsov</u> , R.S. Troshkin, V.A. Bityurin (JIHT RAS, Moscow, Russia) |
| 16:40-17:00 | 4.3 3D numerical simulation of longitudinal-transverse DC electrical discharge in a supersonic flow , <u>D.A. Tarasov</u> , A.A. Firsov (JIHT RAS, Moscow, Russia) |
| 17:00-17:20 | 4.4 Influence on detached supersonic gas flow caused by its turning by means of local rapid heating with spark discharge , Saveliev A.S. (JIHT RAS, Moscow, Russia) |
| 17:20-17:40 | 4.5 On the resonant interaction of exposed electrodes of a symmetric plasma actuator in a subsonic airflow , <u>V.M. Bocharnikov</u> , V.V. Volodin, V.V. Golub (JIHT RAS, Moscow, Russia) |
| 17:40- 18:00 | 4.6 Pulsed Circular Discharge for Combustion of Fuels , <u>E.I. Grudiev</u> , G.P. Kuzmin, I.M. Minaev, O.V. Tikhonovich (Prokhorov GPI RAS, Moscow, Russia) |
| 11:00-18:00 | POSTER SESSION 13 |

April 27 (Wednesday)

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| 09:15-09:30 | On-line connection for nonresident and foreign participants |
| 09:30-10:50 | SESSION 5. PLASMA AERODYNAMICS - 1 Chairman Pavel <u>Polivanov</u> |
| 09:30-09:50 | 5.1 Experimental study of the response of the near field of a subsonic turbulent jet to the action of a plasma actuator as part of an active control system, <u>O.P. Bychkov</u> ¹ , V.A. Kopiev ¹ , V.F. Kopiev ¹ , G.A. Faranosov ¹ , P.N. Kazansky ² , I.A. Moralev ² (¹ TsAGI Moscow Research Complex, ² JIHT RAS, Moscow, Russia) |
| 09:50-10:10 | 5.2 Investigation of the transverse flow instability initiated by the DBR actuator on the swept model, <u>A.Ya. Kotvitskii</u> , A.A. Abdulaqev, P.N. Kazansky, M.V. Ustinov, I.A. Moralev (JIHT RAS, Moscow, Russia) |
| 10:10-10:30 | 5.3 Narrow-band slat noise attenuation by HF DBD actuator in landing conditions, <u>V.A. Kopiev</u> , V.F. Kopiev (TsAGI Moscow Research Complex, Moscow, Russia) |
| 10:30-10:50 | 5.4 Effect of a surface sliding discharge on a supersonic flow with an inclined shock wave, <u>I. Mursenkova</u> ¹ , Yu .Liao ¹ , I. Ivanov ¹ , A. Ziganshin ¹ (M.V.Lomonosov MSU, Physics Faculty, Moscow, Russia) |
| 11:00-11:20 | COFFEE BREAK |
| 11:20-13:00 | SESSION 6. SHOCK WAVES Chairman Pavel Georgievskiy |
| 11:20-11.40 | 6.1 Shock wave interaction with grid turbulence, L.S. Shtemenko, and <u>F.V. Shugaev</u> , (M.V.Lomonosov MSU, Physics Faculty, Moscow, Russia) |
| 11:40-12:00 | 6.2 Thermographic fields evolution of the shock tube channel area heated by a high-current pulse discharge, <u>I.A. Znamenskaya</u> , E.A. Karnozova, E.Y. Koroteeva, T.A. Kuli-zade (M.V.Lomonosov MSU, Physics Faculty, Moscow, Russia) |
| 12:00-12:20 | 6.3 Stimulated Detonation of a High-Energy Heterogeneous Plasma Formation Created by Capillary Erosive Plasmatron and Magneto- Plasma Compressor, <u>A.I.Klimov</u> , V.G.Brovkin, A.S.Pashchina (JIHT RAS, Moscow, Russia) |
| 12:20-12.40 | 6.4 Radiation due to the motion of a shock wave in a collisional plasma, A.S.Baryshnikov (Ioffe PTI RAS, Saints-Petersburg, Russia) |
| 12:40-13.00 | 6.5 Method for Determining the Parameters of Shockwave Structures in a Medium with Thermal Misbalance, <u>D.S. Riashchikov</u> ¹ , N.E. Molevich ^{1,2} , D.I. Zavershinskii ^{1,2} (¹ Lebedev Physical Institute RAS, ² SNRU, Samara, Russia) |
| 13:00-14:00 | LUNCH |

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| 14:00-15:40 | SESSION 7. PLASMA AERODYNAMICS - 2 Chairman Irina Znamenskaya |
| 14:00-14:20 | 7.1 Study of the receptivity of laminar buffet to disturbances generated by electric discharge , <u>P.A. Polivanov</u> , A.A. Sidorenko (<i>Khristianovich ITAM SB RAS, Novosibirsk, Russia</i>) |
| 14:20-14:40 | 7.2 Focusing Effect for Single-Pulse Energy Deposition to Supersonic Flow Localized Upstream of a Body , <u>P.Yu. Georgievskiy</u> , V.A. Levin (<i>IMEch, MSU, Moscow, Russia</i>) |
| 14:40-15:00 | 7.3 Re-breakdown of longitudinal-transverse DC discharge in a supersonic flow , <u>V.A. Bityurin</u> , A.N. Bocharov, A.S. Dobrovolskaya, E.A. Filimonova, A.A. Firsov (<i>JIHT RAS, Moscow, Russia</i>) |
| 15:00-15:20 | 7.4 Stochastic disturbances, induced by the barrier discharge in Blasius boundary layer. Theory and experiment , <u>I. Moralev</u> , M. Ustinov, A. Kotvitskii, I. Popov, I. Selivonin, P. Kazanskii (<i>JIHT RAS, Moscow, Russia</i>) |
| 15:20-15:40 | 7.5 Similarity relation for the pulsation frequency of a continuous optical discharge , M.A. Kotov, <u>S.Yu. Lavrentyev</u> , N.G. Solovyov, A.N. Shemyakin, M.Yu. Yakimov (<i>Ishlinsky IPM RAS, Moscow, Russia</i>) |
| 15:40-16:00 | 7.6 Evolution of disturbances from electric discharge in the zone of shock wave boundary layer interaction , <u>O.I. Vishnyakov</u> , P.A. Polivanov, A.A. Sidorenko, A.D. Budovskiy (<i>Khristianovich ITAM SB RAS, Novosibirsk, Russia</i>) |
| 16:00-16:20 | COFFEE BREAK |
| 16:20-18:00 | SESSION 8. ELECTRICAL DISCHARGES - 4 Chairman Vadim Brovkin |
| 16:20-16:40 | 8.1 Electric Charge Build-Up at Pulsed Streamer Corona , S.B. Leonov (<i>University of Notre Dame, USA</i>) |
| 16:40-17:00 | 8.2 NS Streamers: Role of humidity and kinetic processes on the propagation distance and critical electric field , <u>A. Starikovskiy</u> ¹ , N. Aleksandrov ² , E. Bazelyan ³ (¹ <i>Princeton University, USA</i> , ² <i>MIPT, Dolgoprudny, Moscow Region, Russia</i> , ³ <i>Krzhizhanovsky Power Engineering Institute, Moscow, Russia</i>) |
| 17:00-17:20 | 8.3 Role of gap geometry and pulse rise time on propagation of megavolt-range streamers in long gaps , <u>A.Starikovskiy</u> ¹ , N. Aleksandrov ² , E. Bazelyan ³ (¹ <i>Princeton University, USA</i> , ² <i>MIPT, Dolgoprudny, Moscow Region, Russia</i> , <i>Krzhizhanovsky Power Engineering Institute, Moscow, Russia</i>) |
| 17:20-17:40 | 8.4 Studies of the binding of the argon arc to the cathode , <u>M.A. Sargsyan</u> , D.V. Tereshonok, A.S. Tyuftyaev, M.Kh. Gadzhiev, Z.G. Karchugaeva (<i>JIHT RAS, Moscow, Russia</i>) |
| 17:40-18:00 | 8.5 Investigation of the hafnium cathode of a low-temperature nitrogen and air plasma generator with the addition of propane-butane , <u>M.Kh. Gadzhiev</u> , M.A. Sargsyan, M.V. Ilyichev, D.I. Yusupov, A.S. Tyuftyaev (<i>JIHT RAS, Moscow, Russia</i>) |
| 11:00-18:00 | POSTER SESSION 13 |

April 28 (Thursday)

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| 09:15-09:30 | On-line connection for nonresident and foreign participants |
| 09:30-11:10 | SESSION 9. PLASMA ASSISTED COMBUSTION BIOLOGICAL AND MEDICAL APPLICATIONS OF GAS-DISCHARGE PLASMA Chairman Dmitry Kavyrshin, |
| 09:30-09:50 | 9.1 Comparison of characteristics of low temperature atmospheric plasma jet generated by positive pulsed and sinusoidal voltages for plasma medicine, <u>I. Schweigert</u> ¹ , D. Zakrevsky ^{2,3} , E. Milakhina ^{2,3} , P. Gugin ³ , M. Varlamov ⁴ , M. Birukov ⁴ and O. Koval ^{4,5} (¹ ITAM SB RAS, ² ISP SB RAS, ³ NSTU, ⁴ ICBFM SB RAS, ⁵ Department of Molecular Biology NSU, Novosibirsk, Russia) |
| 09:50-10:10 | 9.2 The effect of non-thermal plasma on morpho-physiological characteristics of barley plants at different developmental phases, <u>V.A. Kharlamov</u> , I.M. Medzhidov, D.I. Petrukhina, O.V. Tkhorik, V.I. Shishko, S.A. Gorbatov, P.N. Tsygvintsev, V.N. Tikhonov (Russian Institute of Radiology and Agroecology, Kaluga region, Obninsk, Russia) |
| 10:10-10:30 | 9.3 Modification and validation of the kinetic model for problems of plasma-assisted combustion in an ethylene-air mixture, <u>E.A. Filimonova</u> , A.S. Dobrovolskaya (JIHT RAS, Moscow, Russia) |
| 10:30-10:50 | 9.4 Mechanisms of the non-stationary flame acceleration and transition to detonation in acetylene-based gaseous mixtures <u>I. Yakovenko</u> ¹ , A Kiverin ¹ , A. Tyurnin ¹ , A. Yarkov ¹ , P. Krivosheyev ² , A. Novitski ² , O. Penyazkov ² (¹ JIHT RAS, Moscow, Russia, ² A.V. Luikov Heat and Mass Transfer Institute, Belarus) |
| 11:00-11:20 | Перерыв |
| 11:20-13:00 | SESSION 10. RELATED PROBLEMS - 1 Chairman Gennady Liziakin |
| 11:20-11:40 | 10.1 Magnetosphere response to solar wind forcing: 2D MHD simulation results at various plasma flow parameters, E.V. Gubanov ¹ , <u>A.P. Likhachev</u> ¹ , and S.A. Medin ^{1,2} (¹ JIHT RAS, Moscow, ² MIPT, Dolgoprudny, Moscow Region, Russia) |
| 11:40-12:00 | 10.2 Measurement of the photoionization cross section of the first excited state of lithium in a magneto-optical trap, <u>S.A. Saakyan</u> , L.G. D'yachkov, S.V. Klimov, K.P. Galstyan, V.A. Sautenkov, B.B. Zelener (JIHT RAS, Moscow, Russia) |
| 12:00-12:20 | 10.3 Iron corrosion in the radiative plasma of moist air, V.N. Babichev, K.E. Galeeva, A.H. Kirichenko, A.A. Nekrasov, A.V. Ugodchikova, <u>N.I. Trushkin</u> , A.V. Fillipov, Yu.V. Cherepanova (SRC RF TRINITI, Moscow, Troitsk, Russia) |
| 12:20-12:40 | 10.4 Development of a software package for determining the spatial distribution of plasma parameters and its testing on the example of capillary discharge plasma, D.I. Kavyrshin, A.S. Pashchina, <u>A.S. Myazin</u> , E.A. Muravyeva (JIHT RAS, Moscow, Russia) |
| 12:40-13:00 | 10.5 Dynamics of fast and slow magnetoacoustic waves in magnetic slabs with thermal misbalance <u>D.V. Agapova</u> ^{1,2} , S.A. Belov ^{1,2} , N.E Molevich ^{1,2} , D.I. Zavershinskii ^{1,2} (¹ SNRU, ² Lebedev Physical Institute RAS, Samara, Russia) |
| 13:00-14:00 | LUNCH |

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| 14:00-15:40 | SESSION 11. RELATED PROBLEMS - 2 Chairman Anatoly Pashchina |
| 14:00-14:20 | 11.1 Investigation of near-surface plasma near the model of the thermonuclear reactor thermal cladding by optical emission spectroscopy, <u>E.A. Muravyeva</u>^{1,2}, V.F. Chinnov¹, D.I. Kavyrshin^{1,2}, V.P. Budaev², S.D. Fedorovich², A.V. Karpov,² A.S. Myazin^{1,2} (¹JIHT RAS, ²NRU "MPEI) |
| 14:20-14:40 | 11.2 Termoelectrohydrodynamics of a weakly conductive liquids and gases, <u>M.S. Apfelbaum</u>, A.N. Doludenko (JIHT RAS, Moscow, Russia) |
| 14:40-15:00 | 11.3 Some consequences of the quantum estimation the minimum thermal conductivity, A.V. Galaktionov (JIHT RAS, Moscow, Russia) |
| 15:00-15:20 | 11.4 Kinematic characteristics of vector lines of layered vector fields and their relation to gyroscopic inertia forces, B.M. Burakhanov (JIHT RAS, Moscow, Russia) |
| 15:20-15:50 | 11.5 On the nature of the strange radiation detected in some electrophysical processes, Chistolinov A.V. (JIHT RAS, Moscow, Russia) 11.6 On the theory of the strange radiation, Chistolinov A.V. (JIHT RAS, Moscow, Russia) |
| 15:50-16:10 | COFFEE BREAK |
| 16:10-18:00 | SESSION 12. RELATED PROBLEMS - 3 Chairman Anatoly Klimov |
| 16:10-16:30 | 12.1 Numerical simulation of plasma-vortex reactor with metallic micro- and nanoparticles, <u>D.P. Porfiriev</u>^{1,2}, I.P. Zavershinskii¹ (¹SNRU, ²Lebedev Physical Institute RAS, Samara, Russia) |
| 16:30-16:50 | 12.2 Optical and Soft X-ray Spectra Measured in Swirl Heterogeneous Plasma Flow with Erosive Ni - Nano- Clusters and Water Steam, <u>A.I. Klimov</u>, N.K. Belov, G.E. Voliano (JIHT RAS, Moscow, Russia) |
| 16:50-17:10 | 12.3 The structure of the swirling flow in the counterflow vortex reactor, <u>D.P. Porfiriev</u>^{1,2}, I.P. Zavershinskii¹, A.I. Klimov³ (¹SNRU, ²Lebedev Physical Institute RAS, Samara, ³JIHT RAS, Moscow, Russia) |
| 17:10- 17:30 | 12.4 Fundamentals of unified continuum physics in aeromechanics, plasmodynamics and field theory with technical applications, M.Ja. Ivanov (CIAM, Moscow, Russia) |
| 17:30- 17:50 | 12.5 An analysis of a non-relativistic and relativistic models of ball lightnings, A.G. Oreshko (NARU "MAI", Moscow, Russia) |
| 11:00-18:00 | POSTER SESSION 13 |
| 17:50-18:00 | CLOSING |

POSTER SESSION 13

13.1 Pulsed Erosive Discharge in a Fluoroplast Capillary as a Spectroscopic Object, V.F.Chinnov, A.S.Pashchina, E.A.Muravyeva (*JIHT RAS Moscow, Russia*)

13.2 Investigation of gas-droplet flow in presence of electrical discharge, A.S. Saveliev (*JIHT RAS Moscow, Russia*)

13.3 Some techniques for diagnostics of a cold plasma jet generated on the base of an atmospheric pressure microwave discharge, S.N. Antipov, A.V. Chistolinov, M.A. Sargsyan, M.Kh. Gadzhiev (*JIHT RAS, Moscow, Russia*)

13.4 Relative theoretical thermochemistry stability of Al₂O₂ and Al₂O₃ conformers, A.V. Mitin^{1,2}, V.A. Bityurin², A.N. Bocharov² (¹MIPT, Dolgoprudny, Moscow Region, ²JIHT RAS, Moscow, Russia)

13.5 Optimization of heated air supply in supersonic facility, A.A. Firsov¹, S.B. Leonov² (¹JIHT RAS, Moscow, Russia, ²University of Notre Dame, USA)

13.6 Features of heat propagation on small scales and times, A.V. Galaktionov (*JIHT RAS, Moscow, Russia*)

13.7 Influence of Power and Geometric Parameters of a Pulsed Capillary Discharge on the Spatial Distribution of Chemical Elements, A.S. Pashchina, A.V. Efimov (*JIHT RAS, Moscow, Russia*)

13.8 Use of the TCSPC method to study the development of the dielectric barrier discharge, S. Kuvardin^{1,2}, I. Selivonin¹, I. Moralev¹ (¹JIHT RAS, Moscow, ²MIPT, Dolgoprudny, Moscow Region, Russia)

13.9 Flow Control in a Rectangular Shallow Cavity Using a DBD Discharge Using Feedback, P.N. Kazanskiy, I.A. Moralev, A.V. Efimov (*JIHT RAS, Moscow, Russia*)