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**RUSSIAN ACADEMY OF SCIENCES
SCIENTIFIC COUNCIL FOR DIRECT ENERGY CONVERSION
SCIENTIFIC COUNCIL FOR FLUID MECHANICS
SCIENTIFIC COUNCIL FOR LOW TEMPERATURE PLASMA PHYSICS**

**THE 11TH INTERNATIONAL
WORKSHOP
ON MAGNETO-PLASMA
AERODYNAMICS
(Abstracts)**

**MOSCOW
April 10 – 12, 2012**

**Organized by Institute of High Temperatures of RAS
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April 10 (Tuesday)	
08:30-10:00	REGISTRATION
09:00-09:30	OPENING, Valentin BITYURIN
09:30-11:30	SESSION 1. PLASMA AERODYNAMICS Chairman: Eduard SON
9:30 – 10:00	1.1. Flight Experiments (invited) <i>A. Kvochour</i> (Gromov FTI, Zhukovskiy, Russia)
10:00-10:20	1. 2. Inlet Regulation by Electrical Discharge. <i>S. Leonov</i> (JIHT RAS), <i>M. Goldfeld</i> (ITAM RAS), <i>F. Falempin</i> (MBDA-France)
10:20-10:40	1.3 Flow Separation Dynamics Induced by HF Surface Capacitive Discharge. <i>P.N. Kazansky, A.I. Klimov, I.A. Moralev, S.Yu. Boytsov, D.A. Chertov, V.A. Bityurin</i> (JIHT RAS)
10:40-11:00	1.4 The Influence on Trailing Wingtip Vortex's Parameters with a Help of Dielectric Barrier Discharge. <i>S.A. Agibalova^{1,2}, V.V. Golub¹, I.A. Moralev¹, A.S. Saveliev^{1,2}</i> (¹ JIHT RAS, ² MIPT)
11:00-11:30	COFFEE BREAK
11:30-13:10	SESSION 2. PLASMA ASSISTED COMBUSTION Chairman: Sergey LEONOV
11:30-11:50	2.1 Stabilization of Combustion of High-Speed Propane-Air, Alcohol-Air and Alcohol-Propane-Air Streams under Conditions of Low Temperature Plasma of the Combined Microwave Discharge. <i>V.M. Shibkov, L.V. Shibkova, P.V. Kopyl, O.S. Surkont, I.N. Gusev, V.N. Fedos'kin, E.S. Vasil'eva</i> (MSU)
11:50-12:10	2.2 Thermally-Nonequilibrium Kinetics of Plasma-Assisted Oxidation and Ignition below Self-Ignition Threshold. <i>A. Starikovskiy</i> (Princeton University)
12:10-12:30	2.3 Comparison of Injection Schemes for Ignition of Nonpremixed Fuel by Surface Discharge in Supersonic Flow. <i>D.A. Yarantsev, S.B. Leonov, K.V. Savelkin</i> (JIHT RAS), <i>M.A. Bolshov, Yu. A. Kuritsyn, V.V. Liger, V.R. Mironenko</i> (IS RAS)
12:30-12:50	2.4 Modeling of Kinetic Processes Initiated by the Pulse Nanosecond Discharge in Atmospheric Pressure Air. <i>N.A. Popov</i> (INP MSU)
12:50-13:10	2.5 Plasma-Assisted Oxidation of Aluminum Dusty Particles in Water Steam. <i>V. Bityurin, V. Chinnov, A. Efimov, A. Grigorenko, A. Klimov, D. Kutuzov, O. Korshunov, A. Pashchina, L. Polyakov, B. Tolkunov</i> (JIHT RAS)
13:10:-14:30	LUNCH
14:30-18:00	SESSION 3. PA&PAC ROUND TABLE Chairman : Eduard SON
14:30-15:00	Review of Experimental Results on PA (materials of AIAA-2012). (Invited) <u>A. Klimov</u> (JIHT RAS)
15:00-15:30	V. Vinogradov (CIAM) (Invited)
15:30-16:00	COFFEE BREAK
16:00-18:00	DISCUSSION / V. Vinogradov, A. Starikovskiy, S. Starikovskaya, I. Kossyi, N. Popov, N. Aleksandrov, V. Shibkov, .../
11:00-18:00	PA&PAC POSTER SESSION 10
18:00-19:30	RECEPTION

April 11 (Wednesday)	
08:30-10.00	REGISTRATION
09:00-10:50	SESSION 4. ELECTRICAL DISCHARGES Chairman: Valentin BITYURIN
9:00 – 9:30	4.1. Pulsed Plasma Actuators for Active Separation Flow Control at Low Reynolds Number (invited). <i>B. Göksel, C.N. Nayeri, F. Behrendt, I. Rechenberg, C. O. Paschereit</i> (Berlin University of Technology)
9:30 - 9:50	4.2. Experimental and Numerical Investigation on the Charge Distribution in a DBD Plasma Actuator Surface for Airflow Control. <i>A. Cristofolini, G.Neretti, C.A.Borghi</i> (Bologna University)
9:50 - 10:10	4.3. On Development of a Surface DBD in Dense Gases Excited by a Single Negative High-Voltage Pulse. <i>Yu. Akishev, G. Aponin, M. Grushin, V. Karalnik, A. Petryakov, N. Trushkin</i> (SRC RF TRINITI)
10:10 - 10:30	4.4. Dynamics of electric field and ignition of combustible mixtures by nanosecond surface dielectric barrier discharge at pressures P = 1 – 5 atm. <i>I.N.Kosarev^{1,2}, S.A. Stepanyan¹, V.N. Khorunzhenko², E.I. Mintoussov¹, P.N. Sagulenko^{1,2}, N.A. Popov³, S.M. Starikovskaia¹</i> (¹ Ecole Polytechnique, ² MPTI, ³ INP MSU)
10:30 - 10:50	4.5. Electrical Breakdown of a Gas in a Long Tube under Longitudinal Magnetic Field. <i>A.V. Nedospasov</i> (JIHT RAS)
10.50:11:20	COFFEE BREAK
11:20-13:10	SESSION 5. SHOCK AND ACOUSTIC WAVES Chairman: Victor GOLUB
11:20-11:50	5.1. Shock Waves in Magneto-Plasma Aerodynamics (invited). <i>V.A. Bityurin</i> (JIHT RAS)
11:50-12:10	5.2. Bow Shock Pulsations in the Flow around a Plate at Strong MHD Interaction. <i>V.P. Fomichev, M.A. Yadrenkin</i> (ITAM SB RAS)
12:10-12:30	5.3. Shock-on Shock High Speed Flow Correction Using Nanosecond Discharges. <i>I.A. Znamenskaya</i> (MSU)
12:30-12:50	5.4 Plasma Control of Self-oscillating Impact Jets. <i>V.M. Fomin, B.V. Postnikov, and K.A. Lomanovich</i> (ITAM SB RAS)
12:50-13:10	5.5. Electron Density Distribution Near the Front of Combustion Wave in CH₄ : O₂ and H₂ : O₂ Mixtures. <i>N.K. Berezhetskaya, S.I. Gritsinin, I.A. Kossyi, N.A. Popov, N.M. Tarasova, K.V. Artem'ev, E.A. Filimonova</i> (IGP RAS, MSU, JIHT RAS)
13:10-14:15	LUNCH
14:15-18:00	SESSION 6. GD, S&A WAVES ROUND TABLE Chairman : Valentin BITYURIN
14:15-14:45	V. Kopiev (TsAGI) (Invited)
14:45-15:15	A. Mironov (CIAM) (Invited)
15:15-15:45	COFFEE BREAK
15:45-17:45	Discussion /V. Golub, V. Kopiev, A. Mironov, Yu. Akishev, I. Kossy, V. Soloviev, A. Klimov, V. Belokogne,... /
11:00-17:00	PA&PAC POSTER SESSION 10
17:45-19:00	RECEPTION

April 12 (Tuesday)	
08:30-10.00	REGISTRATION
09:00-10:50	SESSION 7. MHD FLOW CONTROL Chairman: Vadim ALFEROV
9:00 – 9:20	7.1 Hypersonic Flow Control Near a Plate Using a RF Discharge in a Magnetic Field. (invited) <i>V.P. Fomichev, M.A. Yadrenkin</i> (ITAM SB RAS)
9:20-9:40	7.2 Temperature Dynamics of Plasma Focus in Air-Breathing Micro-Magneto-Plasma Thruster. <i>I.Mashek, V. Lashkov, V. Vinerov, D.Mikhailov</i> (S.PtSU)
9:40 - 10:00	7.3. Experimental Investigation into Dynamics of a Gas Discharge in a Solenoidal Magnetic Field. <i>S.V. Bobashev, N.P. Mende, N.A. Monakhov, V.A. Sakharov</i> (PhTI RAS)
10:00 - 10:20	7.4. Effect of 2 MHz Gas Discharge and Magnetic Field on Plasma Layer at the Surface in Supersonic Flow. Kinetic Modeling. <i>I.V. Schweigert</i> (ITAM SB RAS)
10:20 - 10:40	7.5. Structure and Parameters of Gas Flows under Action of Electrical Discharges in External Magnetic Field. <i>I.B. Klementyeva, I.A. Moralev</i> (JIHT RAS)
10:40 - 11:00	7.6 Generation of High-Speed Plasma Flows by Electromagnetic Rail Accelerators. <i>A.V. Erofeev, B.G. Zhukov, R.O. Kurakin, T.A. Lapushkina, S.A. Poniaev</i> (PhTI RAS)
11.00:11:30	COFFEE BREAK
11:30-13:00	SESSION 8. SWIRLING FLOW AND RELATED PROBLEMS Chairman: Anatoly Klimov
11:30-11:50	8.1 Nonstationary Structure of Swirl Flows in an Open Tube Channel with Heat Sources. <i>V.G.Makaryan¹, N.E. Molevich^{1,2}, D.P.Porfiriev^{1,2}, S.S.Sugak¹, I.P. Zavershinsky¹</i> (¹ SSAU, ² Samara Branch of PhI RAS)
11:40-12:00	8.2 The Unified Theory of Transport Processes in the Frame of Non-Local Physics. <i>B.V. Alexeev</i> (IFCT MSU)
12:00-12:20	8.3 Resonance Tunneling of Electromagnetic Waves Through Gradient Barriers in Plasmas. <i>N.S. Erokhin¹, M.V. Poverennyi² and E.S. Merkulov²</i> (¹ SRI RAS, ² I.A.Bunin ESU)
12:20-12:40	8.4 Oscillations of Flow Parameters in the Vicinity of Vortex Rings in Viscous Heat-Conducting Gas. <i>O.A. Solenaya, F.V. Shugaev</i> (MSU)
12:50-13:10	8.5 TBD
13:10-14:30	LUNCH
14:30-18:00	SESSION 9. RELATED PROBLEMS Chairman: Anatoly KLIMOV
14:30-15:00	L. Urutskoev (MSUPA) (Invited)
15:00-15:30	A. Nesterovich (AC “MEPhI”) (Invited)
15:30-16:00	COFFEE BREAK
16:00-18:00	DISCUSSION/ A.I. Klimov, ...
11:00-18:00	RELATED PROBLEMS POSTER SESSION 12
18:00	CLOSING

April 10 (Tuesday)

POSTER SESSION 10

PLASMA AERODYNAMICS

10.1. Simulation of Aerodynamic Heating for Exomars Entry Conditions by RF-Plasmatron. *A.F. Kolesnikov, A.N. Gordeev, S.A. Vasilevskii* (IPM RAS)

10.2 Flow Control over Circular Cylinder Airfoil Model by Surface HF Plasma Actuator. *P.N. Kazansky, A.I. Klimov, I.A. Moralev, S.Yu. Boytsov* (JIHT RAS)

PLASMA ASSISTED COMBUSTION

10.3 Plasma-Based Shock Structure Modification in Supersonic Inlet. *A. Firsov, S. Leonov, D. Yarantsev* (JIHT RAS), *M. Goldfeld* (ITAM RAS)

10.4 The Reactive Species Production and Ignition of the Hydrogen- Oxygen Mixture by RF DBD. *I.A. Shkurenkov, Yu.A. Mahkelevich and T.V. Rakhimova* (INP MSU)

10.5 Spectral Diagnostics of Mixing, Induced by High Voltage Discharge, by Means of Probe Discharge. *M. Shurupov, S. Leonov, K. Savelkin, D. Yarantsev* (JIHT RAS)

10.6 Features of Ignition Discharge in Crossed Fields in the Anode Layer Thruster with Thermionic Cathode. *A.N. Ermilov, V.F. Eroshenko, Yu.A. Kovalenko, S.V. Korolev, T.V. Chernyshev, A.P. Shumilin* (FSUE VEI)

10.7. Combustion enhancement by the DBD plasma swirler. *LI.Gang, XU Yan Ji* (Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China), *Alexander A. Firsov, Sergey B. Leonov* (Joint Institute for High Temperature, Russian Academy of Science, Moscow, Russia)

10.8. Evaluation of radiative losses of burning aluminum *V. A. Bityurin and A. V. Galaktionov* (JIHT RAS)

10.9. On vortex nature of "gatchina" gischarge. *Bychkov V. L., Savenkova N.P., Troshiev Yu.V.* (MSU)

April 11 (Wednesday)

POSTER SESSION 11

ELECTRICAL DISCHARGES

11.1 The Mechanism of Specific Localization of Pulse Discharge in Nonhomogeneous Media.

I.V.Kochetov, A.P.Napartovich (TRINITI) S.B. Leonov (JIHT RAS)

11.2 Interaction of Supersonic Jet with Capacity Coupled HF Discharge.

K. Khasanov, A. Klimov, A. Pashchina, I. Moralev, M. Sidorenko (JIHT RAS, *MSU)*

11.3 High-Energy Radiation of Continuous Medium as it Interacts with Submillimeter Fields of Outer Space. K. Khasanov (MSU)

11.4 Features of Dynamics and Structure of Long-Lived Plasma Formations Initiated by the Capillary Type Discharge. A.S. Pashchina, M.K. Sidorenko (JIHT RAS)

11.5 Stationary Pre-Breakdown Volt-Ampere Characteristics of Weakly-Ionized Mediums. M.S.

Apfelbaum, V.I. Vladimirov, V.Ya. Pecherkin (JIHT RAS)

11.6 Investigation on the Existence Region of Intensive Discharge in Crossed Fields in Hall

Thruster. A.N. Ermilov, V.F. Eroshenko, D.N. Novichkov, Yu.A. Kovalenko,

T.M. Sapronova, S.V. Korolev, T.V. Chernyshev, A.P. Shumilin (FSUE VEI)

11.7 Destruction of Toluene in the Steady -State Glow Discharge at Atmospheric Pressure in

Humid Air. Yu.S. Akishev, M.E. Grushin, I.V. Kochetov, A.N. Trushkin, N.I. Trushkin (SRC, RF TRINITI)

11.8 On specifics of DD Neutron Generation Along Low Energy Nanosecond Vacuum

Discharge with Deuterium-Loaded Pd Anode . S.Yu. Guskov (Lebedev PhI), Yu.K. Kurilenkov, V.P.

Tarakanov, V.T. Karpukhin (JIHT RAS)

11.9 Periodic Discharge in a Stream of Liquid and Anomalous Phenomenas in the Post-

Discharge Period. B. Bogdanovich, A. Nesterovich (AC “MEPhI”)

11.10 Spatial and dynamic characteristics of dielectric barrier discharge (DBD) at variation of

dielectric's parameters. A.M. Frolov, S.B. Leonov (JIHT RAS), V.R. Soloviev (MIPT)

11.11 Scattering of Electromagnetic Waves by a Microwave Streamer. V.A. Bityurin , V.G.

Brovkin, P.V. Vedenin (JIHT RAS)

SHOCK AND ACOUSTIC WAVES

11.12 Shock Wave Splitting Effect in Glow Discharge Plasma and Electro Dynamical Parameters of Plasma. A.S. Baryshnikov, I.V. Basargin, M.V. Chistyakova (PhTI RAS)

11.13 Super-Ion-Acoustic Streaming of Sphere. Yu.L. Serov (PhTI RAS)

11.14 Generation of Cylindrical Shock Waves in air. S.S. Bychkov, S.S. Bychkov (Jr.),

L.N. Pyatnitsky, N.V. Tretyakova (JIHT RAS)

11.15 Nonlinear Analysis of Stability of Polygonal Converging Shock Waves.

A.V. Konyukhov, A.P. Likhachev (JIHT RAS)

11.16 The Effect of Viscosity for the Interaction of a Shock Wave With a Thin Layer

P.Yu. Georgievsky, D. Lenkov, O.G. Sutyurin, V.P. Fokeev (Institute of Mechanics of Moscow State University)

11.17 Influence of Carbon Nanoparticles to Distribution of Charges Behind Shock Wave. S.Ya.

Bronin, A.V. Emelianov, A.V. Eremin, A.G. Khrapak (JIHT RAS)

April 12 (Thursday)

POSTER SESSION 12

MHD FLOW CONTROL

12.1 Features of Hypersonic MHD Flow Over at Separation Zone Arising: Simulation in Full MHD Model. *E.V. Gubanov, A.P. Likhachev, and S.A. Medin* (JIHT RAS)

12.2 Interaction of the Magnetically Driven Arc Discharge with a Mixing Layer of a High-Velocity Turbulent Jet. *I.A. Moralev, V.D. Zhaketov* (JIHT RAS)

SWIRLING FLOW/RELATED PROBLEMS

12.3 Acceleration of Ions and Electrons in a Planar Gap. *Yu.A. Kovalenko, T.V. Chernyshev, A.S. Chikhachev* (FSUE VEI)

12.4 Light in Noninertial Reference Systems with Constant Phase Structure. *B.V. Melkounian* (A.M. Prokhorov GPhI RAS)

12.5 Study of Electrical Explosion of Copper Conductor in a Strong External Magnetic Field. *A.N. Vlasov, S.V. Zhimoloskin, A.B. Manoshkin, S.S. Potashevsky* (RSRTU)

12.6 Plasma Filament Decay in Atmospheric Pressure Air in External Electric Field. *S.V. Bodrov¹, M.V. Tsarev¹, A. Mirzanev¹, N.L. Aleksandrov², I.V. Kochetov³, A.N. Stepanov¹* (¹IAP RAS, ²MIPT, ³TRINITI)

12.7 Prospects of Development of a Problem of Physics, Chemistry and Technology of Antimatter. *E.P. Prokopiev* (FGBU SSC RF – ITEP)

12.11 Development of Research Methods of Gas Phase of Electric Explosion of Conductors. *L.I. Urutskoev, A.O. Biryukov* (MSUPA)

12.12 To Chemical Nature of Ball Lightning. *V.L. Bychkov* (MSU)

12.13 On Ball Lightning Energy. *V.L. Bychkov, G. Zharik, A.S. Osokin, V.V. Nizovtsev* (MSU)

12.14 The Analysis of Video Film Which Has Been Shot on June, 3rd, 2009 in the Town Dolgoprudny (Russia). *A.I. Nikitin, T.F. Nikitina, A.M. Velichko* (IEPCPh, RAS)

12.15 Nonlinear oscillations in an inhomogeneous plasma layer with chemical reactions. *A.R. Karimov* (JIHT RAS)

12.8 The Meaning and Significance of the Experimental and Theoretical Peculiarities of Mach Reflection *V.A. Belokogne* (OI RAS, RANS, Academia Cosmonautica)

12.9 The Inertial-fusion Propulsion Vehicles of XXI century: Spacecraft, Aircraft and Marine Ships. *V.A. Belokogne* (OI RAS, RANS, Academia Cosmonautica)

12.10 The Antimatter Stimulated Annihilation as the Fundamental and Useful phenomena In the Plasma and Energy Basic and Applied Researches. *V.A. Belokogne* (OI RAS, RANS, Academia Cosmonautica)