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The book contains the materials on the fundamental and applied problems of pulsed lasers. May be interesting for researches and engineers working in the sphere of quantum electronics, spectroscopy, plasma physics, medicine, remote sensing and laser technologies.

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CONTENTS

Plenary Session 6
Y. Young Scientists Session 13
A. Gas and Plasma Lasers, Metal Vapor Lasers 28
B. Photonics of Optical Materials, Optoelectronics 53
C. Femtosecond Laser Systems 68
D. Laser Systems and New Laser and Optical Technologies, Laser Applications 82
E. Non-Coherent UV and VUV Sources 107
F. Conversion of Laser Radiation, Optoelectronic Devices 115
G. Round table "Biophotonics" 124
H. Gas Discharges for Lasers and Non-Coherent Radiation Sources ... 130
Author's Index 145

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E-10

TEMPERATURE MODE OF BARRIER DISCHARGE XeCl EXCILAMP

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The energy parameters of axial radiation of barrier discharge XeCl excilamp located in a closed opaque cavity are measured. The excilamp excitation was performed by a high voltage pulses at f = 15 kHz. It is shown that a decrease in the nominal lamp supply voltage by 10% led to increase in the emission intensity of the λ_p = 308 nm, as well as to decrease (by 16.7%) in the level of thermal radiation, to accelerate of radiation flux reaching and to reduction in instability by 19.6%.

This study was partially supported by a Project RFBR No. 15-08-00726.

E-11

CALCULATION OF PLASMA PARAMETERS OF THE GLOW DISCHARGE ON THE WATER IN AIR AT ATMOSPHERIC PRESSURE

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For the calculation of the electrical characteristics of plasma are used normal conditions for air and experimentally measured CVC. It allows to estimate the maximum value of the electron density for the threshold mode and breakdown. Thus, near the cathode the obtained maximum values are following $E = 1.7 \cdot 10^8$ V/m for the electric field, $2.6 \cdot 10^{-6}$ m – size of the cathode layer, 0.0134 m^2/s – electron mobility, $2.36 \cdot 10^6$ m/s – drift velocity and E/N = 7184.5 Td. E = 77250 V/m, the mobility of 0.6398 m^2/s, 49426.93 m/s – drift velocity, E/N = 3.2 Td for the positive column.

In the discharge with the cathode on the basis of distilled water the estimated value of the electron concentration is equal to $(1–2) \cdot 10^{11}$ cm^{-3} for the positive column and to $(2–9) \cdot 10^{12}$ cm^{-3} for the cathode layer. For chemically-active molecules and radicals the concentration evaluated from the ratio of OH and NO with the N_2 emission intensities by selection of the partial pressures in the Specair software can reach the order of 10^{16} cm^{-3}.

E-12

PARAMETRIC STUDY OF DBD EXCILAMPS SUPPLIED WITH CONTROLLED SQUARE CURRENT PULSES

H. Piquet[1], A. Wiesner[1,2], D. Florez[2], A. Belinger[1], and R. Diez[2]

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A parametric study of a system dedicated to non-coherent UV emission, by means of DBD excilamps, supplied by a controlled square shape current source is proposed. The presentation highlights on the one hand the performances experimentally obtained by combining together:

A set of 20 different bulbs with different diameters, gap and wall thicknesses (all the bulbs are filled with the same XeCl gas mixture, the length is 600 mm and the injected electrical power can reach up to 500 W) 13;

Different electrical power supplying conditions: magnitude, frequency (in the 30–200 kHz range) and duty cycle of the square shape current pulses 2 injected into the bulb. Low frequency burst modulation, with adjustable duty cycle of this supply is also superimposed.

AUTHOR'S INDEX

A

Abdullin E.N. **H-21**
Ageev B.G. **D-1, D-11**
Akishev Yu.S. **P-12, H-5, H-9, H-10, H-16, H-17**
Aksenov V.P. **Y-17**
Aksenova Iu.V. **E-4**
Alam M.M. **P-8**
Alekseev S.V. **P-2 , Y-9**
Allahverdiyev K.R. **P-3**
Ambrozevich S.A. **A-50**
Amrenov A.K. **A-2**
Andreev M.V. **A-15, A-16, A-17, A-19, C-12**
Andreev V.V. **H-8**
Andreev Yu.M. **P-9 , F-2, F-3, F-5, F-6, F-9, F-11**
Andrienko O.S. **A-50**
Antsygin V.D. **F-1**
Apeksimov D.V. **C-11**
Apresyan L.A. **B-7, B-10, B-18, B-19**
Arakelian S.M. **D-37**
Artyukhov V.Ya. **B-22, B-23**
Asratyan A.A. **A-49**
Avdeev S.M. **D-8, E-10, H-6**
Averyushkin A.S. **D-25, D-31, D-32, D-40, F-17**
Avtaeva S.V. **E-6, H-7**
Azamoum Y. **C-3**

B

Babaeva N.Yu. **H-1**
Babushkin P.A. **C-8, Y-23**
Baksht E.Kh. **H-4**
Balakirev A.A. **D-24, H-5, H-9, H-10, H-16, H-17, P-12**
Baranov A.N. **D-40**
Barsukov N.I. **B-1, F-12**
Baryshnikov G.V. **B-17**
Bashkirtsev D.E. **E-4**
Basov G.F. **H-21**
Batenin V.M. **A-48**
Bazyl' O.K. **B-23**
Beerepoot M.T.P. **P-8**
Bel'kov M.V. **B-23**
Belinger A. **E-12**
Belskaya E.V. **A-41**
Berezin M.B. **E-4**
Betina L.L. **A-49**
Blinova O.M. **H-2**
Bloshkina A.I. **G-1**
Bocharnikova E.N. **Y-14**
Bokhan P.A. **A-11, A-41, A-46, B-24, H-3**
Borisov A.V. **G-7, G-8, G-10**
Boroznovskaya N.N. **D-19**
Bryantseva N.G. **Y-3, Y-14**
Bublik M.A. **D-8, D-43**
Buchanov V.V. **D-28**
Bulychev N.A. **A-50, D-7, D-25, D-29, D-30, D-31, D-32, D-36, D-40, F-17**
Bulychev N.V. **D-34**
Bulygin A.D. **C-4, C-14**
Bumagina N.A. **Y-1**
Burachenko A.G. **D-8, D-43, H-4**
Bureev O.A. **A-18**
Burkhanov I.S. **D-32**
Burkin E.Y. **A-9**
Burnashov A.V. **C-8, Y-23**
Burumbaeva K.R. **Y-12**
Bychenko A.B. **D-30**
Bychkov Yu.I. **A-15, A-27**

C

Chaikov L.L. **D-7, D-25, D-36**
Charmasson L. **C-3**
Chebotarev G.D. **A-8, A-25, A-39**
Cherepanov V.N. **B-17**
Chernov A.A. **D-29, D-31, D-32**
Chernykh V.V. **D-5**
Chuchma M.P. **E-11**
Chudinova Yu.V. **G-2**
Churkin D.S. **A-4, D-5**
Chvykov V. **P-7**
Clady R. **C-3**

D

Dandl T. **P-10**
Danilkin M.I. **E-2**
Dauengauer E.I. **D-5**
Degtyarenko K.M. **B-5, B-13**
Denisov L.K. **C-20, Y-7**
Deshabo V.A. **D-38**
Didenko M.V. **H-18**
Diez R. **E-12**
Dimaki V.A. **A-35, D-19, Y-20**
Dmitriev A.A. **E-10**
Dolgushin S.A. **D-38**
Drozdova A.K. **B-17, G-6**
Druzhinin A.V. **B-12**
Dudorov V.V. **Y-17**
Dvoretskii S.A. **H-15**
Dvoretskiy D.A. **C-20, Y-7**

E

Eden J.G. **P-5, A-3**
Efimkov V.F. **F-17**
D-12, D-13
Egorov O.V. **D-14**
Emelyanov N.M. **Y-27**
Eplanov D.O. **C-7**
Ermakova O.V. **D-5**
Erofeev M.V. **H-11, H-15, Y-6**
Erokhin A.I. **F-17**
Evstigneev V.L. **F-16**
Evtushenko G.S. **A-12, A-36, A-47, D-37, Y-11**

Ezhov D.M. **F-9, Y-5**

F

Fakhrutdinova E.D. **D-4**
Fateev N.V. **B-24**
Fedorov A.I. **A-33, A-34**
Fedorov V.F. **A-36**
Fedoseeva E.V. **Y-21**
Feofanov I.N. **A-48, B-20, D-25, D-33**
Ferre A. **C-3**
Filimonov G.A. **Y-17**
Filippov V.G. **D-9**
Filon D.G. **A-22**
Filonov A.G. **A-31, A-32, A-40**
Firsov V.A. **D-9**
Florez D. **E-12**
Frolov S.A. **C-5, C-7**

G

Gadirov R.M. **B-5, B-15, D-21**
Gadomsky S.Ya. **B-5**
Gao Y.Q. **P-9**
Garibian B.A. **D-29**
Gavrilov N.V. **A-18**
Geiko P.P. **E-1**
Geints Y.E. **P-6**
Genin D.E. **Y-12, D-6**
Gerasimova M.A. **B-4, B-9, B-21, Y-4**
Gerke M.N. **D-37**
Goltsova P.A. **D-42, E-9, G-2**
Golubev A.S. **D-18**
Goncharova D.A. **D-4**
Gorbunkov V.I. **E-5, E-10, G-2**
Gordienko Yu.N. **B-1, F-12**
Gornastaev L.M. **Y-4**
Grechin S.G. **F-3**
Gribenyukov A.V. **Y-18**
Grigoryants A.G. **A-49, A-50**
Grigoryev D.V. **H-15**
Gritsuta A.N. **D-11, D-20**
Grudtsin Ya.V. **C-9**
Gubarev F.A. **G-1, Y-2**
Gugin P.P. **A-11, A-41, A-42, A-46, H-3**
Guk A.S. **F-16**
Gulyayev Yu.V. **F-16**

H

Heneral A.A. **E-6**
Herring C.M. **P-5**
Herrmann D. **P-10**
Huang J.-G. **F-2, F-6, F-11, P-9**
Huang Z.-M. **F-2, F-6, F-11, P-9**

I

Iglakova A.N. **C-8, C-11, F-7, F-8, F-10, Y-23**
Ignatov A.G. **D-2**
Il'gach D.M. **B-14, B-15**
Ionin A.A. **F-13, C-1**
Iskakov I.A. **D-5**
Istomin K.A. **H-6**
Ivanov I.G. **A-26**
Ivanov M.V. **P-2, Y-9, Y-16**
Ivanov N.G. **C-6, C-18, C-22, P-2, Y-9, Y-16**
Ivashkin P.I. **D-33**

K

Kabanov A.M. **C-11**
Kachurin E.A. **D-3**
Kalinichenko A.N. **H-6**
Kalinichenko N.P. **H-6**
Kamynina D.A. **D-15**
Kaplunov M.G. **B-5**
Karalnik V.B. **H-5, H-9, H-10, H-16, H-17, P-12**
Karasik V.E. **C-20, Y-7**
Karelin V.I. **H-2**
Karpukhin V.T. **A-48**
Kashirskii D.E. **D-12, D-13, D-14**
Kazakevich P.V. **D-15**
Kazakevich V.S. **D-15**
Kazaryan M.A. **A-48, A-49, A-50, B-7, B-10, B-18, B-19, D-7, D-9, D-25, D-27, D-28, D-29, D-30, D-31, D-32, D-34, D-35, D-36, D-39, D-40, D-41, E-2, F-16, F-17**
Kazaryan S.M. **D-9**
Kharcheva A.V. **D-22, D-26**
Khassenov M.U. **A-2, B-1, F-12**
Khoroshman N.E. **D-43**
Khundzhua D.A. **Y-21, Y-24**
Kim V.A. **A-42**
Kinyaevskiy I.O. **F-3, F-13**
Kireeva A.I. **B-6**
Kirichenko M.N. **D-7, D-29, D-30, D-31, D-32, D-36**
Kirpichnikov A.V. **C-10, C-13, C-15, C-17, C-21**
Kirtsideli I.Yu. **G-3**
Kistenev Yu.V. **G-6, G-7, G-8, G-9, G-10**
Klimachev Yu.M. **F-13**
Klimenko N.A. **A-49**
Klimkin A.V. **A-23, A-28, D-1, D-11, D-19, D-20, Y-15**
Knyazkova A.I. **G-7, G-8, G-10**
Kobotayeva N.S. **E-14**
Kochetkov Yu.V. **F-13**
Kokh A.E. **F-1**
Kokh K.A. **P-9, F-1, F-2, F-11**
Kokhanenko G.P. **D-1, Y-15**
Kokovin A.O. **H-20**
Kolosov V.V. **Y-17**
Kolovskaya O.S. **G-4**
Kononova N.G. **F-1**
Konovalov I.N. **A-15, A-17**
Kopylova T.N. **B-5, B-13, B-14, B-15**
Koribut A.V. **C-9**
Koryukin V.I. **A-24**
Koryukina E.V. **A-24**
Kostadinov I.K. **D-23, G-5, Y-10**
Kozlov A.Yu. **F-13**
Kozlov B.A. **A-20, A-21, A-22**
Kpkhanenko G.P. **D-20**
Kraiski A.A. **D-27**
Kraiski A.V. **D-27**

Krasnikova S.S. **B-5**
Krasnova E.D. **D-22, D-26**
Krasovskii V.I. **B-7, B-10, B-18, B-19, B-20, D-25, D-33**
Krayukhina V.S. **Y-3**
Krolevets O.S. **Y-17**
Kryshtob V.I. **B-7, B-18, B-19, B-20 B-10**
Kuchinskaya O.I. **C-11**
Kudelin I.S. **Y-7, C-20**
Kudryavtseva A.D. **D-34, D-40**
Kulagin A.E. **Y-13, A-13**
Kulikov N.S. **A-21, A-22**
Kulsartov T.V. **B-1, F-12**
Kuptsov G.V. **C-10, C-13, C-15, C-17, C-21**
Kurbanismailov V.C. **A-6**
Kurcevich A.E. **B-14**
Kuryak A. **D-11**
Kuryak A.N. **D-20**
Kuryak A.N. **Y-15**
Kuznetsov V.S. **E-7**
Kuznetsova M.V. **D-34**
Kuznetsova R.T. **E-4, Y-1**

L

Lanskii G.V. **F-1, F-2, F-3, F-11, P-9**
Lapin I.N. **D-4, G-4**
Laptev A.V. **C-10, C-13, C-15, C-17, C-21**
Lashchuk O.O. **B-21**
Latush E.L. **A-25, A-39, C-19**
Lavrukhin M.A. **A-11, A-46, H-3**
Lepekhin N.M. **D-9**
Lepnev L.S. **D-31**
Levitskiy M.E. **Y-17**
Li L. **G-1**
Lidsky V.V. **D-35**
Limonova T.F. **D-34**
Lipatov E.I. **D-8, D-42, D-43, E-15, Y-12**
Lisenko A.A. **P-9**
Lisenkov V.V. **A-14, D-3, D-16, D-17**
Litvinenko K.L. **F-1**
Liu D.P. **H-18**
Loeva Ya.A. **G-5**
Login I.V. **A-20**
Lomaev M.I. **H-20**
Losev V.F. **A-15, A-16, A-17, C-6, C-12, C-18, C-22, F-1, F-5, P-2, Y-9, Y-16**
Lubenko D.M. **C-22, F-1, F-5**
Lugovskoi A.A. **Y-27**
Lukyashin K.E. **B-11**
Lunev A.G. **Y-25**
Lunina O.N. **D-22**
Lyabin N.A. **A-48, A-49, A-50**
Lyabin N.F. **D-9**
Lyakhov N.Z. **D-21**

M

Machs E.M. **G-3**
Maiorov S.A. **A-6**
Maksimov R.N. **B-11**
Malikov M.M. **A-48**
Malin T.V. **B-24**
Mamaev S.B. **C-2**
Mamrashev A.A. **F-1**
Manh D.K. **A-21, A-22**
Martirosyan R.M. **D-41**
Masalov A.V. **D-7, D-36**
Matvienko G.G. **C-11, F-7 , F-8, F-10**
Mayer G.V. **B-8, B-16, B-22, B-23, Y-3, Y-14**
Medvedev A.E. **A-43, H-14**
Medvedev M.A. **H-5, H-9, H-10, H-16, H-17, P-12**
Merezhko A.G. **Y-4**
Mesarosh L.V. **E-11**
Mesyats G.A. **P-2**
Mikhailov S.I. **F-17**
Mikheev L.D. **C-2 , C-9, P-2**
Milovanovic D. **P-4**
Minaev B.F. **B-17**
Mironov A.E. **A-3, P-5**
Mironova T.V. **D-27**
Mkhitaryan R.G. **A-50**
Moiseev A. V. **B-2**
Moiseeva N. M. **B-2**
Mokrousova D.V. **C-1**
Mokrushin Yu.M. **F-16**
Morozova E.A. **D-29, F-16**
Murav'yov E.N. **D-28**
Musorov I.S. **A-47, Y-22**

N

Naidis G.V. **H-1**
Nemtseva E.V. **B-21**
Nguyen M.T. **A-21, A-22**
Nikiforov V.N. **D-30**
Nikoghosyan A.S. **D-41**
Nikolaev N.A. **F-1**
Nikolaev V.V. **G-6, G-9**
Nikonov S.Yu. **B-14, B-15, D-21**
Nikonova E.N. **B-14, B-15**

O

Odintsova E.S. **D-38**
Odod A.V. **B-5, B-13, D-21**
Omarov O.A. **A-6**
Orekhov I.O. **C-20, Y-7**
Orishich A.M. **D-5**
Orlov A.N. **A-14, B-12**
Orlovskii V.M. **E-13, E-14**
Oshlakov V.K. **C-8, C-11, F-7, F-8, F-10, Y-23**
Osinnykh I.V. **B-24**
Osipov K.Yu. **D-11, D-20, Y-15**
Osipov V.V. **A-14, A-18, B-11, B-12, D-3, D-16, D-17, P-11**
Ozol D.I. **E-2**

P

Palyanov P.A. **C-12**
Panarin V.A. **D-42, E-7, E-8, E-9, E-13, F-14, G-2, H-12, H-18**
Panchenko A.N. **A-5**
Panchenko N.A. **A-5**

Panchenko Yu.N. **A-15, A-16, A-17, A-19, C-12, P-2**
Papayeva E.O. **D-5**
Paramonov V.G. **A-49**
Paramonova G.M. **A-49**
Parfenov K.D. **D-16**
Park S.-J. **P-5**
Pashayev A.M. **P-3**
Pathmanaban A. **Y-2**
Patsaeva S.V. **D-22, D-26, Y-21, Y-24**
Pechenitsyn D.S. **D-42, E-9, G-2, H-12**
Pestryakov E.V. **C-10, C-13, C-15, C-17, C-21**
Petrov A.V. **C-11**
Petrov D.V. **D-6**
Petrov V.A. **C-10, C-13, C-15, C-17, C-21**
Petrov V.V. **C-10, C-13, C-15, C-17, C-21**
Petryakov A.V. **H-5, H-9, H-10, H-16, H-17, P-12**
Petukhov T.D. **A-12, Y-17,**
Pinaev P.A. **A-43**
Piquet H. **E-12**
Platonov V.V. **B-11, D-3, D-16**
Pnev A.B. **C-20, Y-7**
Podkin A.V. **D-3**
Podshivalov S.N. **Y-18**
Polunin Yu.P. **A-7, A-25, A-38, A-39, A-44, A-45, D-23, G-5, Y-8, Y-10**
Polyakov E.V. **C-2**
Pomogaev V.A. **B-3**
Ponkratov Yu.V. **B-1, F-12**
Ponomarev I.V. **D-9**
Ponomarev Yu.N. **D-1, D-11, D-20**
Postnikov V.A. **D-27**
Priseko Yu.S. **D-9**
Prokop'ev V.E. **A-45, C-18, C-22, F-7 , F-8, F-10**
Prokopenko A.A. **Y-1**
Prokopiev V.E. **A-23, C-6, D-19,**
Prokoshev V.G. **D-18, D-37**
Puchikin A.V. **A-15, A-16, A-17, A-19, C-12**

R

Radak B. **P-4**
Ragimkhanov G.B. **A-6**
Rasmagin S.I. **B-7, B-10, B-18, B-19, B-20, D-25, D-33**
Ratakhin N.A. **P-1, P-2**
Razhev A.M. **D-5, A-4**
Razmahnin I.E. **Y-8**
Revenko V.I. **D-28**
Ripenko V.S. **H-11, H-15, H-20, Y-6**
Rivera J.A. **P-5**
Rogashevskii A.A. **C-2**
Rostov A.P. **Y-17**
Rudenok I.P. **B-6**
Ruud K. **P-8**
Ryzhinskaya K.A. **G-4**

S

Sachkov V.I. **A-48, A-49, A-50, D-9, D-28, D-35, D-39, D-41**
Sadikhov I.Z. **P-3**
Samarkhanov K.K. **B-1, F-12**
Samokhvalov I.V. **E-1**
Samsonova L.G. **B-5, B-13**
Saraeva I.V. **F-17**
Savinykh Yu. **E-14**
Savvichev A.S. **D-22**
Sazonkin S.G. **C-20, Y-7**
Seleznev L.V. **C-1, F-13**
Semenov V.I. **A-30**
Sentis M. **C-3**
Serdyukov V.I. **Y-27**
Shabalina A.V. **D-4, G-4**
Shadyro O.I. **B-23**
Shafikov A.G. **H-5, H-9, H-10, H-16, H-17, P-12**
Shakin O.V. **F-16**
Shalaev P.V. **D-38**
Shamanin I.V. **D-39**
Shamanin V.I. **D-39**
Shapovalov A.V. **G-9 G-10**
Shefer O.V. **D-13, D-14**
Shen J. **D-41**
Shershnev S. **H-21**
Sheshin E.P. **E-2**
Shevchenko S.N. **D-30**
Shevchenko M.A. **D-27**
Shibitov Yu.M. **H-2**
Shiganov I.N. **A-49, A-50**
Shirokikh A.P. **C-2**
Shitov V.A. **A-18, B-11, B-12, D-17**
Shiyanov D.V. **A-10, A-31, A-32, A-33, A-34, A-35, A-36, A-40**
Shuaibov A.K. **E-11**
Shulepov M.A. **H-11, H-15, Y-6**
Shumeiko A.S. **A-25, A-39, A-44, A-45, D-23, G-5, Y-10, Y-18**
Shuo Zh. **Y-15**
Simakova A.V. **E-15**
Simonova G.V. **D-1, D-11, D-20, Y-17**
Sinitsa L.N. **Y-27**
Sinitsyn D.V. **F-13**
Sitnik K.A. **C-6, C-18**
Skakun V.S. **E-7, E-8, E-9, D-42, F-14, G-2, H-12, H-18**
Skobczova K.A. **B-16**
Slyusarenko N. **B-4**
Slyusareva E.A. **B-4, B-9, Y-4**
Smirnov S.S. **E-1**
Sokolova I.V. **B-8, B-16, E-3**
Sokovikov V.G. **A-23, A-28, A-29, A-31, A-40, D-19, Y-15**
Soldatov A.N. **A-1 , A-7, A-25, A-39, A-44, A-45, D-23, F-4, G-5, Y-8, Y-10, Y-18**
Solodova T.A. **B-14**
Solomonov V.I. **E-5**

Song Y. **H-18**
Sorokin A.R. **H-13, H-19**
Sorokin G.M. **A-30**
Sorokina-Terexova T.G. **A-30**
Sosnin E.A. **D-42, E-8, E-7, E-9, E-15, F-14, G-2, H-6, H-12, H-18**
Spirina L.V. **G-8**
Steinforth A. **P-5**
Stepanov A.P. **A-20**
Strokov M.A. **D-40**
Sukhanov V.B. **A-35**
Sultanov T.T. **D-27**
Sunchugasheva E.S. **C-1**
Surkov Yu.S. **E-5**
Svetlichnyi V.A. **D-4, F-2, F-9, F-11, P-9, Y-5**
G-4
Sytnik J.D. **G-1**

T

Tagiyev B.H. **P-3**
Talalaev M.A. **F-16**
Tanichev A.S. **Y-5**
Tarasenko V.F. **A-5, D-8, D-42, D-43, E-7, E-8, E-9, E-15, F-14, Y-6, G-2, H-4, H-11, H-12 H-15, H-18, Y-12**
Tchaikovskaya O.N. **B-8, B-16, Y-3, Y-14**
Tcheremiskine V. **C-3**
Tcherniega N.V. **D-34, D-40**
Tel'minov E.N. **A-12, B-14**
Terekhova V.A. **Y-21**
Tereshchenko S.A. **D-38**
Tikhonov E.V. **D-3, D-16**
Timofeev V.I. **F-7**
Timoshenko V.Yu. **D-30**
Ting H. **D-41**
Titkov A.I. **D-21**
Tkachenko R.A. **A-4**
Tolstorozhev G.B. **B-23**
Tonoyan G.A. **A-50**
Torgaev S.N. **A-13, A-47**
Trenkin A.A. **H-2**
Trigub M.V. **A-36, D-10, D-37, Y-11, Y-19, Y-20, Y-25, Y-26**
Trofimov V.A. **C-9**
Troitskii V.O. **A-31, A-35, A-40, F-15, Y-26**
Trtica M.S. **P-4**
Trubetskaya O.E. **Y-24**
Trubetskoj O.A. **Y-24**
Trunov A.N. **D-5**
Trunov V.I. **C-5, C-7**
C-15
Trushkin N.I. **H-5, H-9, H-10, H-16, H-17, P-12**
Tulubayev Ye.Yu. **B-1, F-12**

U

Ulrich A. **P-10**
Uteza O. **C-3**

V

Valiev R.R. **B-17**
Vangonen A.I. **G-3**
Vasilieva A.V. **G-5**
Vasnev N.A. **Y-19, Y-20**
Vereschagina N.Yu. **E-2**
Vershinin N.O. **B-16, E-3**
Viktorova I.A. **G-2**
Vlasov V.V. **Y-11, Y-26**
Voitsekhovskaya O.K. **D-12, D-13, D-14, H-15**
Volkov A.V. **A-9**
Vorob'ev D.S. **E-15**
Voronkova N.A. **G-2**
Voronov D.A. **D-26**
Vrazhnov D.A. **G-9**
Vusovich O.V. **B-8**

W

Wieser J. **P-10**
Wiesner A. **E-12**

Y

Yakimanskii A.V. **B-14, B-15**
Yakunin V.G. **D-30**
Yakuschenko I.K. **B-5**
Yalovoy V.I. **C-2, C-9**
Yampolskaya S.A. **A-15, A-16, A-27**
Yao N.J. **F-11, P-9**
Yaresko P.S. **D-15**
Yaresko S.I. **D-24**
Yastremskii A.G. **A-27, C-16, P-2**
Yudin I.K. **D-38**
Yudin N.A. **A-25, A-37, A-38, A-39, Y-8 Y-18, A-7**
Yudin N.N. **A-37, A-38, Y-8, Y-18 A-7**
Yukhin Yu.M. **D-21**
Yunusova N.V. **G-7**
Yurin V.Yu. **D-23, Y-10, Y-18**

Z

Zadorin D.A. **D-25**
Zakharyan A.R. **D-30, D-31, D-32**
Zakharyan R.A. **D-25**
Zakrevsky Dm.E. **A-11, A-41, A-46, B-24, H-3**
Zaurbekova Zh.A. **F-12, B-1**
Zemlyanov A.A. **P-6 , C-11, C-4, C-14**
Zemskov K.I. **D-34, D-40**
Zemtsov D.S. **F-13**
Zhiltsova A.A. **D-22, D-26**
Zhou W. **P-9 , F-11**
Zhuravlev K.S. **B-24**
Zubarev I.G. **F-17**
Zvereva G.N. **G-3**
Zvyagin M.Yu. **D-18**

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