

7 Publications

- [1] K. D. Lawson, K. M. Aggarwal, I. H. Coffey, F. P. Keenan, M. G. O'Mullane, L. Ryć, J. Zacks, and JET-EFDA Contributors, An analysis of VUV CIV emission from the JET divertor giving measurements of electron temperatures.
Plasma Physics and Controlled Fusion (2011) **53**, 015002:1-22
- [2] D. Klir, J. Kravarik, P. Kubes, K. Rezac, E. Litseva, K. Tomaszewski, L. Karpiński, M. Paduch, and M. Scholz, Fusion neutron detector for time-of-flight measurements in z-pinch and plasma focus experiments.
Review of Scientific Instruments (2011) **82**, 33505:1-7
- [3] P. Kubes, M. Paduch, T. Pisarczyk, M. Scholz, T. Chodukowski, D. Klir, J. Kravarik, K. Rezac, I. Ivanova-Stanik, L. Karpiński, M. J. Sadowski, K. Tomaszewski, and E. Zielińska, Spontaneous Transformation in the Pinched Column of the Plasma Focus.
IEEE Transactions on Plasma Science (2011) **39**, 1:562-568
- [4] E. Składnik-Sadowska, K. Malinowski, M. J. Sadowski, M. Kubkowska, K. Jakubowska, M. Paduch, M. Scholz, I. E. Garkusha, M. Ladygina, and V. I. Tereshin, Optical spectroscopy of free-propagating plasma and its interaction with tungsten targets in PF-1000 facility.
Contributions to Plasma Physics (2011) **51**, 2-3:1-5
- [5] E. Zielińska, M. Paduch, and M. Scholz, Sixteen-frame interferometer for a study of a pinch dynamics in PF-1000 device.
Contributions to Plasma Physics (2011) **51**, 2-3:279-283
- [6] R. Prokopowicz, B. Bieńkowska, K. Drozdowicz, S. Jednoróg, E. Kowalska-Strzęciwilk, A. Murari, S. Popovichev, K. Pytel, M. Scholz, A. Szydłowski, B. Syme, G. Tracz, and JET-EFDA Contributors, Measurements of neutrons at JET by means of the activation methods.
Nuclear Instruments and Methods in Physics Research A (2011) **637**, 1:119-127
- [7] A. Czarnecka, K.-D. Zastrow, J. Rządkiwicz, I. H. Coffey, K. D. Lawson, M. G. O'Mullane, and JET-EFDA Contributors, Determination of metal impurity density, ΔZ_{eff} and dilution on JET by VUV emission spectroscopy.
Plasma Physics and Controlled Fusion (2011) **53**, 35009:1-16
- [8] D. Klir, P. Kubes, M. Paduch, T. Pisarczyk, T. Chodukowski, M. Scholz, Z. Kalinowska, E. Zielińska, B. Bieńkowska, J. Hitschfel, S. Jednoróg, L. Karpiński, J. Kortanek, J. Kravarik, K. Rezac, I. Ivanova-Stanik, and K. Tomaszewski, Experimental evidence of thermonuclear neutrons in a modified plasma focus.
Applied Physics Letters (2011) **98**, 071501:1-3
- [9] V. A. Gribkov, C. Tuniz, E. V. Demina, A. V. Dubrovsky, V. N. Pimenov, R. Maslyaev, R. Gaffka, M. Gryaznevich, E. Składnik-Sadowska, M. J. Sadowski, R. Miklaszewski, M. Paduch, and M. Scholz, Experimental studies of radiation resistance of boron nitride, C₂C ceramics Al₂O₃ and carbon-fiber composites using a PF-1000 plasma-focus device.
Physica Scripta (2011) **83**, 045606:1-12

- [10] M.Polasik, K.Słabkowska, K.Kozioł, J.Starosta, J.-Cl.Dousse, J.Hoszowska, and J.Rzadkiewicz, Lifetimes of doubly K-shell ionized states. *Physica Scripta* (2011) **T144**, 014021:1-3
- [11] S.Chaurasia, S.Tripathi, L.Ryć, and L.J.Dhareshwar, Influence of laser focal position on X-ray and ion emission of copper plasma. *Nuclear Instruments and Methods in Physics Research A* (2011) **638**, 1:110-115
- [12] R.Kwiatkowski, E.Składnik-Sadowska, K.Malinowski, M.J.Sadowski, K.Czaus, J.Żebrowski, L.Karpiński, M.Paduch, and M.Scholz, Measurements of electron and ion beams emitted from the PF-1000 device in the upstream and downstream direction. *Nukleonika* (2011) **56**, 2:119-123
- [13] K.Jakubowska, M.Kubkowska, E.Składnik-Sadowska, K.Malinowski, A.K.Marchenko, M.Paduch, M.J.Sadowski, and M.Scholz, Optical emission spectroscopy of plasma streams in PF-1000 experiments. *Nukleonika* (2011) **56**, 2:125-129
- [14] E.Havlíčková, W.Fundamenski, V.Naulin, A.H.Nielsen, R.Zagórski, J.Seidl, and J.Horáček, Steady-state and time-dependent modelling of parallel transport in the scrape-off layer. *Plasma Physics and Controlled Fusion* (2011) **53**, 065004:1-24
- [15] J.Zaleśny, G.Galant, M.Lisak, S.Marczyński, P.Berczyński, A.Gałkowski, and S.Berczyński, Nonlinear evolution of two fast-particle-driven modes near the linear stability threshold. *Physics of Plasmas* (2011) **18**, 062109:1-9
- [16] J.Badziak, G.Mishra, N.K.Gupta, and A.R.Holkundkar, Generation of ultraintense proton beams by multi-ps circularly polarized laser pulses for fast ignition-related applications. *Physics of Plasmas* (2011) **18**, 053108:1-9
- [17] A.Kasperczuk, T.Pisarczyk, T.Chodukowski, Z.Kalinowska, P.Parys, J.Ullschmied, E.Krouský, M.Pfeifer, J.Skala, D.Klir, J.Kravarik, P.Kubes, K.Rezac, and P.Pisarczyk, Interaction of Cu and plastic plasmas as a method of forming laser produced Cu plasma streams with a narrow jet or pipe geometry. *Physics of Plasmas* (2011) **18**, 044503:1-4
- [18] K.Jakubowska, M.Kubkowska, E.Składnik-Sadowska, K.Malinowski, M.Paduch, M.J.Sadowski, M.Scholz, and M.Ladygina, Optical spectroscopy of plasma beam interaction with tungsten target and temporal characteristic of spectral line emission in PF-1000. *Acta Technica* (2011) **56**, T:107-112
- [19] J.Krásá, A.Velyhan, E.Krouský, L.Láska, K.Rohlena, K.Jungwirth, J.Ullschmied, A.Lorusso, L.Velardi, V.Nassisi, A.Czarnecka, L.Ryć, P.Parys, and J.Wołoski, Emission characteristics and stability of laser ion sources. *Vacuum* (2010) **85**, 5:617-621
- [20] P.Jacquet, L.Colas, M.-L.Mayoral, G.Arnoux, V.Bobkov, M.Brix, P.Coad, A.Czarnecka, D.Dodt, F.Durodie, A.Ekedahl, D.Frigione, M.Fursdon, E.Gauthier, M.Goniche, M.Graham, E.Joffrin, A.Korotkov, E.Lerche, J.Mailloux, I.Monakhov, C.Noble, J.Ongena, V.Petrzilka, C.Portafaix, F.Rimini, A.Sirinelli, V.Riccardo, Z.Vizvary, A.Widdowson, K.-D.Zastrow, and JET EFDA Contributors, Heat loads on JET plasma facing components from ICRF and LH wave absorption in the SOL. *Nuclear Fusion* (2011) **51**, 103018:1-16
- [21] S.Jacquemot, F.Amiranoff, S.D.Baton, J.C.Chanteloup, C.Labaune, M.Koenig, D.T.Michel, F.Perez, H.P.Schlenvoigt, B.Canaud, C.Cherfils Clérouin, G.Debras, S.Depierreux, J.Ebrardt, D.Juraszek, S.Lafitte, P.Loiseau, J.L.Miquel, F.Philippe, C.Rousseaux, N.Blanchot, C.B.Edwards, P.Norreys,

- S.Atzeni, A.Schiavi, J.Breil, J.L.Feugeas, L.Hallo, M.Lafon, X.Ribeyre, J.J.Santos, G.Schurtz, V.Tikhonchuk, A.Debayle, J.J.Honrubia, M.Temporal, D.Batani, J.R.Davies, F.Fiuza, R.A.Fonseca, L.O.Silva, L.A.Gizzi, P.Koester, L.Labate, J.Badziak, and O.Klimo, Studying ignition schemes on European laser facilities.
Nuclear Fusion (2011) **51**, 094025:1-9
- [22] J.Badziak and S.Jabłoński, Acceleration of a solid-density plasma projectile to ultrahigh velocities by a short-pulse ultraviolet laser.
Applied Physics Letters (2011) **99**, 071502:1-3
- [23] O.Renner, T.Pisarczyk, T.Chodukowski, Z.Kalinowska, E.Krouský, P.Pisarczyk, M.Smid, J.Ullschmied, and E.Dalimier, Plasma-wall interaction studies with optimized laser-produced jets.
Physics of Plasmas (2011) **18**, 093503:1-5
- [24] S.Barral, J.Kaczmarczyk, J.Kurzyna, and M.Dudeck, Closed-loop control of ionization oscillations in Hall accelerators.
Physics of Plasmas (2011) **18**, 083504:1-5
- [25] S.Barral and J.Miedzik, Numerical investigation of closed-loop control for Hall accelerators.
Journal of Applied Physics (2011) **109**, 013302:1-10
- [26] D.Margarone, J.Krásá, A.Picciotto, L.Torrisi, L.Láska, A.Velyhan, J.Prokupek, L.Ryć, P.Parys, J.Ullschmied, and B.Rus, High current, high energy proton beams accelerated by a sub-nanosecond laser.
Nuclear Instruments and Methods in Physics Research A (2011) **653**, 1:159-163
- [27] A.Kasperczuk, T.Pisarczyk, J.Badziak, S.Borodziuk, T.Chodukowski, S.Yu.Guskov, N.N.Demchenko, D.Klir, J.Kravarik, P.Kubes, K.Rezac, J.Ullschmied, E.Krouský, K.Masek, M.Pfeifer, K.Rohlena, J.Skala, and P.Pisarczyk, Interaction of a laser-produced copper plasma jet with ambient plastic plasma.
Plasma Physics and Controlled Fusion (2011) **53**, 095003:1-16
- [28] M.Polasik, K.Słabkowska, J.Rzadkiewicz, K.Kozioł, J.Starosta, E.Wiatrowska-Kozioł, J.-Cl.Dousse, and J.Hoszowska, $K^h\alpha_{1,2}$ X-Ray hypersatellite line broadening as a signature of K-Shell double photoionization followed by outer-shell ionization and excitation.
Physical Review Letters (2011) **107**, 073001:1-5
- [29] B.Zatko, F.Dubecký, P.Boháček, J.Huran, V.Nečas, and L.Ryć, Development and evaluation of semi-insulating GaAs detectors in hot plasmas diagnostics.
Nuclear Instruments and Methods in Physics Research A (2011) **633**, S:131-133
- [30] S.Borodziuk, T.Chodukowski, Z.Kalinowska, A.Kasperczuk, T.Pisarczyk, J.Ullschmied, E.Krouský, M.Pfeifer, K.Rohlena, J.Skala, and P.Pisarczyk, Forward and backward cavity pressure acceleration of macroparticles.
Applied Physics Letters (2011) **86**, 231501:1-3
- [31] R.Zagórski, V.Pericoli, and G.Telesca, Integrated modeling of ITER scenarios with carbon and tungsten walls.
Journal of Nuclear Materials (2011) **101**, 1:S483-S487
- [32] P.Gąsior, M.Bieda, M.Kubkowska, R.Neu, J.Wołoski, and ASDEX Upgrade Team, Laser induced breakdown spectroscopy as diagnostics for fuel retention and removal and wall composition in fusion reactors with mixed-material.
Fusion Engineering and Design (2011) **99**, 6-8:1239-1242
- [33] G.Telesca, R.Zagórski, S.Brezinsek, W.Fundamenski, C.Giroud, G.Maddison, M.O'Mullane, J.Rapp, M.Stamp, G.Van Oost, and JET EFDA Contributors, Simulation with the COREDIV code of nitrogen-

- seeded H-mode discharges at JET.
Plasma Physics and Controlled Fusion (2011) **53**, 115002:1-15
- [34] E.Lerche, D.Van Eester, J.Ongena, M-L.Mayoral, M.Laxaback, F.Rimini, A.Argouarch, P.Beaumont, T.Blackman, V.Bobkov, D.Brennan, A.Brett, G.Calabro, M.Cecconello, I.Coffey, L.Colas, A.Coyne, K.Crombe, A.Czarnecka, R.Dumont, F.Durodie, R.Felton, D.Frigione, M.Gatu Johnson, C.Giroud, G.Gorini, M.Graham, C.Hellesen, T.Hellsten, S.Huygen, P.Jacquet, T.Johnson, V.Kiptily, S.Knipe, A.Krasilnikov, P.Lamalle, M.Lennholm, A.Loarte, R.Maggiora, M.Maslov, A.Messiaen, D.Milanesio, I.Monakhov, M.Nightingale, C.Noble, M.Nocente, L.Pangioni, I.Proverbio, C.Sozzi, M.Stamp, W.Studholme, M.Tardocchi, T.W.Versloot, V.Vdovin, M.Vrancken, A.Whitehurst, E.Wooldrige, V.Zoita, and JET EFDA Contributors, Optimizing ion-cyclotron resonance frequency heating for ITER: dedicated JET experiments.
Plasma Physics and Controlled Fusion (2011) **53**, 124019:1-18
- [35] D.Batani, M.Koenig, S.Baton, F.Perez, L.A.Gizzi, P.Koester, L.Labate, J.Honrubia, I.Antonelli, A.Morace, L.Volpe, J.Santos, G.Schurtz, S.Hulin, X.Ribeyre, C.Fourment, P.Nicolai, B.Vauzour, L.Gremillet, W.Nazarov, J.Pasley, M.Richetta, K.Lancaster, C.Spindloe, M.Tolley, D.Neely, M.Kozlova, J.Nejdl, B.Rus, J.Wołoski, J.Badziak, and F.Dorchies, The HiPER project for inertial confinement fusion and some experimental results on advanced ignition schemes.
Plasma Physics and Controlled Fusion (2011) **53**, 124041:1-13
- [36] D.Klir, P.Kubes, M.Paduch, T.Pisarczyk, T.Chodukowski, M.Scholz, Z.Kalinowska, B.Bieńkowska, L.Karpiński, J.Kortanek, J.Kravarik, K.Rezac, I.Ivanova-Stanik, K.Tomaszewski, and E.Zielińska, Search for thermonuclear neutrons in a mega-ampere plasma focus.
Plasma Physics and Controlled Fusion (2011) **54**, 015001:1-11
- [37] M.Curuia, M.Anghel, N.Balshaw, P.Blanchard, T.Craciunescu, T.Edlington, M.Gherendi, V.Kiptily, K.Kneupner, I.Lengar, A.Murari, P.Prior, S.Sanders, M.Scholz, S.Soare, I.Stefanescu, B.Syme, V.Zoita, and JET EFDA Contributors, Implementation and testing of the JET gamma-ray cameras neutron filters pneumatic system.
Fusion Engineering and Design (2011) **86**, :1196-1199
- [38] I.N.Demchenko, M.Chernyshova, E.Piskorska-Hommel, R.Minikayev, J.Z.Domagala, T.Yamaguchi, W.C.Stolte, and K.Lawniczak-Jabłońska, An XANES and XES investigation of the electronic structure of indium rich $\text{In}_x\text{Ga}_{1-x}\text{N}$ films.
Journal of Alloys and Compounds (2011) **509**, :9528-9535
- [39] I.N.Demchenko, M.Chernyshova, T.Tyliszczak, J.D.Denlinger, K.M.Yu, D.T.Speaks, O.Hemmers, W.Walukiewicz, G.Derkachov, and K.Lawniczak-Jabłońska, Electronic structure of CdO studied by soft X-ray spectroscopy.
Journal of Electron Spectroscopy and Related Phenomena (2011) **184**, :249-253
- [40] E.V.Demina, V.N.Pimenov, S.A.Maslyaev, V.A.Gribkov, A.V.Dubrovsky, I.P.Sasinovskaya, Yu.E.Ugaste, T.I.Laas, and M.Scholz, Changes in the structure and nitride phase formation in the surface layer of Fe-based alloys under the pulsed action of nitrogen ions and nitrogen plasma.
Plasmochemical Methods for the Production and Treatment of Materials (2011) **2**, 3:230-236

8 Contribution to conferences and workshops

09-12.03.2011, ELI -NP. The Way Ahead, Bucharest, Romania

- P. Rączka: „Production of collimated neutron pulses and positrons in laser-matter interactions” (oral)

08-13.05.2011, 13th International Workshop on Plasma Facing Components, Rosenheim, Germany

- M. Kubkowska, P. Gašior, J. Wołowski, M. Kubkowska, E. Składnik-Sadowska, M.J. Sadowski, K. Czaus, J. Żebrowski, M. Ladygina, I.E. Garkusha: "Spectroscopic study of plasma produced from CFC targets irradiated by pulsed plasma streams" (poster)
- P. Gašior, M. Kubkowska, J. Wołowski: "Dependence of power density and energy fluence on ablation rates and LIBS observation thresholds for laser-irradiated ITER relevant material" (poster)

25.05-1.06.2011, COST Action MP0601, Dublin, Ireland

- M. Chernyshova: "Short Wavelength Laboratory Sources Development and application of triple-GEM detector for X-ray detection" (poster)

04-10.06.2011, 8th International Conference on "Dense Z Pinches", Biaritz, France

- M. Scholz, L. Karpiński: "Megajul Plasma-Focus Experiment" (poster)

12-18.06.2011, Participation In the TechConnect Word Conference and Expo 2011, Boston, USA

- V. Gribkow, E.V. Demina, A.V. Dubrovsky, V.N. Pimenov, S.V. Maslyaev, M. Chernyshova, L. Karpiński, R. Miklaszewski, M. Scholz, C. Tuniz, A. Tartari: "Nanostructure surface layers produced by nanosecond pulsed irradiation of plasma facing materials of fusion reactors and their influence on hydrogen isotope retention by them" (poster)

14-18.06.2011, 10th Kudowa Summer School, Kudowa Zdrój, Poland

- M.J. Sadowski, M. Scholz: "Important issues of high-current plasma experiments of the Z-pinch type" (lecture)
- J. Cikhardt, D. Klir, J. Kravarik, P. Kubes, K. Rezac, L. Karpiński, M. Paduch, E. Zielińska: "The noise reduction of the measured signal in plasma diagnostic with adaptive filtration" (oral)
- Czarnecka, E. Lerche, J. Ongena, D. Van Eester, C. A. Figueiredo, I. H. Coffey, K.-D. Zastrow: "Impurity studies in ITER half-field ICRF heating scenarios in Hydrogen plasmas on JET" (oral)
- K. Jakubowska, J. Rządkiwicz, W. Dominik, M. Scholz, P. Blanchard, M. Chernyshova, T. Czarski, M.H. Czyrkowski, R. Dąbrowski, L. Karpiński, G. Kasprovicz, K. Kierzkowski, I. M. Kudła, K. Pozniak, Z. Salapa, S. Tyrrell, W. Zabolotny K.-D. Zastrow: "Development of 1D Triple GEM soft X-ray detectors for a tokamak plasma" (oral)
- D. Daniłko, J. Kurzyńska: "Hall Effect Thrusters: optimisation of magnetic field topology" (oral)

- J. Miedzik, S. Barral, Z. Peradzyński: "PIC electron GC modeling for Hall thruster simulations" (oral)
- J. Badziak: "Laser-driven generation of intense ion beams for fusion-related applications" (oral)

26.06-02.07.2011, "38th European Physical Society Conference on Plasma Physics", Strasburg, France

- K. Jakubowska, J. Rządkiwicz, W. Dominik, M. Scholz, K-D. Zastrow, M. Chernyshova, T. Czarski, L. Karpiński: "Development of a ID Triple GEM X-ray detector for a high-resolution X-ray diagnostics at JET" (poster)
- A. Kasperczuk, T. Pisarczyk, T. Chodukowski, Z. Kalinowska, S.Yu. Gus'kov, N.N. Demchenko, J. Ullschmied, E. Krouský, M. Pfeifer, K. Rohlena, J. Skala, P. Pisarczyk, „Influence of plastic plasma on process of aluminium plasma jet formation" (poster)
- J. Badziak, S. Jabłoński, P. Rączka, "Efficient generation of high-energy quasi-monoenergetic ion beams using laser-induced cavity pressure acceleration" (poster)
- J. Badziak, T. Pisarczyk, T. Chodukowski, S. Borodziuk, S. Jabłoński, Z. Kalinowska, A. Kasperczuk, P. Parys, P. Rączka, M. Rosiński, J. Wołowski, E. Krouský, M. Pfeifer, J. Skala, J. Ullschmied, R. Liska, M. Kucharik, K. Tomaszewski, P. Pisarczyk, Yong-Joo Rhee, "Laser-induced cavity pressure acceleration – a novel highly efficient scheme of acceleration of dense matter" (poster)
- A. Czarnecka, M. Kubkowska, W. Figacz, S. Jabłoński, J. Kaczmarczyk, J. Wołowski, C. Biedermann, R. Burhenn, R. König, A. Weller, "Concept of pulse height analysis system (PHA) for Wndelstein 7-X " (oral)

14-24.07.2011, International School of Quantum Electronics; 49th Course, Atom and Plasmas in Super-Intense Laser Fields, Erice, Italy

- M. Rosiński, L. Giuffrida, P. Parys, J. Wołowski, L. Torrisi, L. Ando: "Repetitive rate laser ion source with electrostatic acceleration for ion implantation technology" (poster)
- Z. Kalinowska, A. Kasperczuk, T. Pisarczyk, T. Chodukowski, S.Yu. Gus'kov, N.N. Demchenko, J. Ullschmied, E. Krouský, M. Pfeifer, K. Rohlena, J. Skala, P. Pisarczyk: "Investigations of mechanisms of laser radiation absorption at PALS" (poster)

04-09.09.2011, XLI Meeting of Polish Physicists, Lublin, Poland

- J. Badziak: „Inertial thermonuclear fusion: challenges and perspectives" (oral)
- A. Gałkowski: „EURATOM-FUSION program conducted in Poland" (oral)
- J. Wołowski and OPWL Team: „Research and applications of ions generated by laser pulses" (oral)

11-16.09.2011, 6th Euro-Mediterranean Symposium on Laser Induced Breakdown Spectroscopy, Izmir, Turkey

- P. Gąsior, M. Kubkowska, A. Blagoev, W. Skrzeczanowski: "Temporal evolution of tungsten spectra for applications in wall diagnostics in thermonuclear reactors", 6th Euro-Mediterranean Symposium on Laser Induced Breakdown Spectroscopy (poster)

11.09 - 17.09.2011, IFSA 2011 - Inertial Fusion Sciences and Application, Bordeaux, France

- T. Pisarczyk, A. Kasperczuk, T. Chodukowski, Z. Kalinowska, S.Yu. Guskov, N.N. Demchenko, J. Ullschmied, E. Krouský, M. Pfeifer, K. Rohlena, J. Skala, and P. Pisarczyk : „Al plasma jet formation in result of compression of Al plasma stream by surrounding the light plastic plasma" (poster)

- A. Kasperczuk, T. Pisarczyk, J. Badziak, S. Borodziuk, T. Chodukowski, S.Yu. Gus'kov, N. N. Demchenko, D. Klir, J. Kravarik, P. Kubes, K. Rezac, J. Ullschmied, E. Krouský, K. Masek, M. Pfeifer, K. Rohlena, J. Skala, P. Pisarczyk : „Interactions of plastic and copper plasmas in an axially symmetrical geometry” (poster)
- S. Borodziuk, J. Badziak, T. Chodukowski, Z. Kalinowska, A. Kasperczuk, T. Pisarczyk, J. Ullschmied, E. Krouský, M. Pfeifer, K. Rohlena, J. Skala and P. Pisarczyk : „Forward and backward cavity pressure acceleration of macroparticles” (poster)

11.09 – 17.09.2011, ICIS 2011 - ICIS 14th International Conference on Ion Sources, Giardini-Naxos, Italy

- M. Rosiński, L. Giuffrida, P. Parys, P. Gąsior, E. Fazio, A.M. Mezzasalma, L. Torrissi, L. Ando, J. Wołowski: “Laser produced streams of Ge ions accelerated and optimized in the electric fields for implantation into SiO₂ substrates” (poster)
- J. Badziak, S. Jabłoński, P. Rączka: "Efficient production of high-energy carbon ions in the LICPA accelerator" (poster)
- S. Jabłoński and J. Badziak: "Generation of solid-density ultraintense ion beams by a picosecond laser pulse of circular polarization" (poster)

11-14.09.2011, "NUTECH -2011 International Conference on development and Applications of Nuclear Technologies", Krakow, Poland

- S. Jednoróg, A. Szydłowski, M. Scholz, M. Paduch , B. Bieńkowska: “Preliminary measurements of angular distributions of neutrons emitted from PF-1000 facility by indium samples” (oral)

11-15.09.2011, 32nd International Electric Propulsion Conference, Wiesbaden, Germany

- J. Miedzik, S. Barral, S. Zurbach: “Study of Plasma Confinement by Magnetic Fields in Hall Thrusters using Quasi-Neutral PIC Modeling” (oral)
- S. Barral, S. Zurbach, M. Dudeck: “Experimental Investigation of a Layered Graphite/BN Channel for Hall” (oral)
- S. Barral, J. Kaczmarczyk, J. Kurzyrna, M. Dudeck: “Active Control of Hall Thruster Discharge” (oral)
- D. Daniłko, J. Kurzyrna: “IPPLM Hall Effect Thruster – design guidelines and preliminary tests Hall” (poster)

12-16.09.2011, PLASMA-2011 International Conference on Research and Applications of Plasmas, Warsaw, Poland

- M. Kubkowska, P. Gąsior, A. Czarnecka, M. Rosiński, J. Wołowski: “Overview of the application of laser-based techniques in plasma-wall interaction research program at IPPLM” (oral)
- M. Scholz: „Progress on MJ Plasma Focus research at IPPLM” (lecture)
- R. Miklaszewski: "Similarity laws for Plasma-Focus based on MHD model" (oral)
- K. Jakubowska, W. Skrzeczanowski, M. Paduch and M. Scholz: "Principal Component Analysis of the data acquired at the Plasma-Focus-1000 device" (poster)
- T. Chodukowski, T. Pisarczyk, M. Paduch, E. Zielińska, M. Scholz, P. Kubes, K. Rezac, D. Klir: “Study of correlation between electron density distributions and neutron emission during characteristic phases of discharges in PF-1000 device” (oral)
- J. Badziak: “Laser-induced cavity pressure acceleration of dense plasma” (lecture)

- P. Rączka: "Fast ignition with different types of ignition beams" (poster)
- V.A. Gribkov, Pimenov, V. Roschupkin, S. Maslyaev, E. Demina, M. Lyakhovitsky, A. Dubrovsky, I. Sasinovskaya, M. Chernyshova, M. Scholz, M. Crespo, A. Chicutin, C. Tuniz: "Irradiation of austenitic steel 10Cr12Mn14Ni4AlMo and titanium alloy Ti-Al-V by pulsed streams of fast nitrogen ions and plasma in Dense Plasma Focus" (oral)
- A. Kasperczuk, T. Pisarczyk, Z. Kalinowska, T. Chodukowski, S.Yu. Guskov, N.N. Demchenko, J. Ullschmied, E. Krouský, M. Pfeifer, K. Rohlena, J. Skala, and P. Pisarczyk, "Investigations of mechanisms of laser radiation absorption at PALS" (oral)

17-24.09.2011, 5th Workshop on Plasma Production by Laser Ablation, Catania, Italy

- M. Rosiński, P. Gąsior, E. Fazio, L. Ando, L. Giuffrida, L. Torrisi, P. Parys, A.M. Mezzasalma, J. Wołowski: "Laser generated Ge ions accelerated by additional electrostatic field for implantation technology" (poster)
- J. Wołowski, J. Badziak, J. Krása, E. Krouský, L. Láska, A. Mezzasalma, P. Parys, M. Pfeifer, K. Rohlena, J. Ullschmied, M. Rosiński, L. Torrisi: "Studies of fast ion streams produced by high power laser at different target irradiation conditions" (poster)

1-8.10.2011, ITR-IAEA-ICTP International Workshop on Plasma Physics, Trieste, Italy

- V.A. Gribkov, M. Chernyshova: "Fusion Materials Research at Bora Facility" (oral)

3-5.10.2011, ALS user meeting, Berkeley, California, USA

- I.N. Demchenko, M. Chernyshova, E. Piskorska-Hommel, R. Minikayev, J.Z. Domagala, T. Yamaguchi, W.C. Stolte, and K. Lawniczak-Jabłońska: "XAS/RIXS investigation of indium rich In_xGa_{1-x}N films"

04- 07.10.2011, 2nd ELI-Beamlines Scientific Challenges Meeting, Praga, Czech Republic

- J. Badziak, S. Jabłoński, P. Rączka: "Enhanced laser-driven ion acceleration via cavity-amplified radiation pressure" (lecture)

09-14.10.2011, 3rd International Conference on Ultraintense Laser Interaction Science (ULIS 2011), Lisbon, Portugal

- P. Rączka, J. Badziak, S. Jabłoński, P. Rączka: "Efficient generation of high-energy ion bunches via cavity-enhanced radiation pressure" (lecture)

17-20.10.2011, Nanosmat, Kraków, Poland

- P. Gąsior, A. Czarnecka, M. Kubkowska, M. Rosiński, J. Wołowski: "Investigation of laser ablation of Al:W:C:H/D and C:H/D layers and laser produced dust with the use of LIBS and fast CCD cameras" (lecture)

5-12.11.2011, Participation in the 2nd International Workshop on Fast Neutron Detectors and Applications, Ein Gedi, Israel

- V.A. Gribkov, R.A. Miklaszewski, M. Chernyshova, M. Scholz, R. Prokopowicz, K. Tomaszewski, K. Drozdowicz, U. Wiącek, B. Gabańska, D. Dworak, K. Pytel, A. Zawadka, C. Tuniz: "A single-shot nanosecond neutron pulsed technique for a disclosure of hidden explosives and fissile materials" (oral)
- V.A. Gribkov et al.: "Geant4 simulation of Dense Plasma Focus source of Short Neutron Pulses for BNCT applications" (oral)

- V.A. Gribkov et al.: "Detection of explosives and other illicit materials by a single nanosecond neutron pulse – Monte Carlo simulations of the detection process" (oral)
- R. Miklaszewski, U. Wiącek, K. Drozdowicz, D. Dworak, V. Gribkov: "Detection of explosives and other illicit materials by a single nanosecond neutron pulse – Monte Carlo simulations of the detection process" (oral)

09-11.11.2011, Meeting of IFE KiT WG, Brussels, Belgium

- P. Rączka; J. Badziak, S. Borodziuk, T. Chodukowski, S. Jabłoński, Z. Kalinowska, A. Kasperczuk, P. Parys, P. Rączka, M. Rosiński, J. Wołowski: „Report on works performed by IPPLM within the Inertial Fusion Energy - Keep-in-Touch Activity in 2011” (oral)

14-17.11.2011, Kick-off meeting of FP7 "L- μ PPT" project, Logrono, Spain

- J. Kurzyna: "IPPLM General Presentation" (oral)
- S. Barral: „Brainstorming Session Technical Presentation" (oral)

28-29.11.2011, 2nd International Conference Frontiers in Diagnostic Technologies, Frascati, Italy,

- J. Rzakiewicz: " Design of T-GEM detectors for X-ray diagnostics on JET" (poster)

06-10.12.2011, Workshop: Physics with PETAL, Bordeaux, France

- P. Rączka: "HEDP and FI-related experiments at PETAL using Laser-Induced Cavity Pressure Acceleration" (oral)

9 Research projects granted from The Ministry of Science and Higher Education and other Polish organizations supporting research

1. Regional Project Operational Program of the Mazovian province. "Development and modernization of laboratories of high-power lasers"
2. Research project of the Ministry of Science and Higher Education No N N202207438: „Research on laser acceleration and collimation of dense plasma"
3. Research project of the Ministry of Science and Higher Education No N N202 130639: „Review of new concepts of plasma jet generation and their usability to conduct laser inertial fusion and for astrophysical applications"
4. Project of the National Centre for Research and Development: „Research on the physics of interaction of impulse plasma jets with targets made with W/CFC/SS"
5. NCN Grant (research project): „Detection of hazardous materials"
6. Project of the National Centre for Research and Development": "Research and development of the technology for controlled thermonuclear fusion"
7. ICDMP: Foundation of the International Centre of Dense Magnetized Plasma
8. Statutory subsidy for the maintenance of Plasma Focus PF-1000 system: „Experimental study of damages of fusion reactor materials caused by plasma jets and fast ions produced in PF-1000 device"
9. AN-KOM (contract): „Resistance investigation of connectors in the lightning conductor during a lightning strike"
10. PZL Mielec (contract): Resistance tests of fuel tanks' covers against a lightning strike

10 Research projects granted from the 7th FP and other international programmes

Research projects carried out within programme of EURATOM-IPPLM Association

1. Development and application of neutron diagnostics based on activation method for magnetic confinement devices (W7-X)
2. Development of soft X-ray triple GEM gas detector for energy resolved soft x-ray plasma diagnostics
3. Feasibility Studies of MCP Based Detectors for the future VUV and SXR Imaging
4. Construction of a prototype of GEM gas detector, filled with Neon, for detection of 14 MeV neutrons by means of neon activation in the drift region
5. Gamma Ray Cameras: Neutron Attenuators – GRC (JET Notification)
6. Gas Electron Multiplier Detector for X-ray Crystal Spectrometry – GXS (JET Order + Notification) Maintenance, continuing development, verification and validation of the ETS (Priority Support)
7. Spectrometry of soft X-ray emission from W7-X stellarator with the use of PHA and MFS diagnostics
8. Spectroscopic and ion diagnostics for laser-induced removal of fuel and co-deposits from PFCs in tokamaks
9. Laser detritiation and co-deposit removal for various plasma-facing components supported by optical spectroscopy and ion diagnostics (JET Notification)
10. Assessment of efficiency of laser removal of fuel-inventory for mixed material samples using LIBS (JET Order + Notification)
11. Qualification of the LIBS operation on ITER relevant calibrated samples (Priority Support)
12. IFE keep-in-touch activity

Other international research programmes and projects

1. HIPER Design Study of an European High Power Laser Experim. Research Facility. „Study and verification of the scientific and technological basis for IFE Fast Ignition Facility”. WP9, WP10 and WP12
2. SILMI - Super-Intense Laser-Matter Interactions, Research Networking Programme (RNP) of ESF
3. Grant LaserLab-EUROPE: “Plasma jets interaction with plasmas and other jets”
4. Grant LaserLab-EUROPE: “The effect of preformed plasma on a laser-driven shock”
5. Grant LaserLab-EUROPE: „Effective generation of the third harmonics of the KrF laser”
6. COST Action MP 0601: “Short Wavelength Laboratory Sources”

7. Grant FP7 – L- μ PPT: “Innovative Liquid Micro Pulsed Plasma Thruster for Nanosatellites”
8. Grant CNRS: “Hall thrusters for geostationary satellites and for interplanetary spacecrafts”
9. Grant SNECMA: “Simulation of electrons in Hall effect motors”
10. Grant FP7 – HiPER: „High Power Electric Propulsion: a Roadmap for the future” (Grant agreement No. 218859)
11. Grant NATO: SST.NR.SFPP 981118 „Nanosecond radiation pulses for rapid detection of explosives and nuclear agents”
12. Grant MAEA 14525: “Modernization of PF-1000 facility”
13. Grant MAEA 16956: “Experimental investigations of damage characteristics”
14. Grant MAEA 14526: “Development of the PF-6 device”
15. Grant MAEA 16954: “Application of the PF-6 device”

11 International conferences and workshops organized with IPPLM participation

PLASMA-2011 - International Conference on Research and Applications of Plasmas, Warsaw, Poland, September 12 – 16, 2011.

General information

The Conference PLASMA-2011, was organized according to the tradition of bi-annual plasma conferences held in Poland since 1993. Taking into consideration the growing interest in scientific collaboration between Poland and other EC countries as well as Russia and Ukraine, the Polish plasma community have organization of PLASMA 2-11conference in Warsaw, Poland, on September 12-16, 2011. This conference was designed for interested plasma researchers, engineers, and students from all the countries, and particularly for those from the Central and Eastern Europe.

Organizers of the Conference

Committee of Physics of the Polish Academy of Sciences

The Andrzej Soltan Institute for Nuclear Studies (INS) in Swierk n. Warsaw

The Institute of Plasma Physics and Laser Microfusion (IPPLM) in Warsaw

- Chairman of the International Scientific Committee: Prof. Jerzy Wołowski (FPiLM)
- Chairman of the Local Organizing Committee: Prof. Marek Sadowski (NCBJ)

Topics of the Conference:

1. Elementary processes and general theory of plasma phenomena
2. Plasmas in tokamaks and tokamak-related experiments
3. Plasmas produced by Z-pinch and Plasma-Focus discharges
4. Plasmas generated by intense laser beams
5. Plasmas of micro-wave and glow discharges
6. Plasmas produced by spark- and arc-discharges
7. Plasmas in space (ionospheric, planetary, and solar)
8. Applications of quasi-stationary and pulse plasmas.

The invited talks were published in an internationally recognized scientific journal *Nukleonika* (<http://www.nukleonika.pl/>). Proceedings of the conference are available on CD-ROMs and Internet.

10th Kudowa Summer School “Towards Fusion Energy”, Kudowa Zdroj, Poland, June 14-18, 2011

General Information

The Polish Association EURATOM - Institute of Plasma Physics and Laser Microfusion (IPPLM), together with Czech and Hungary EURATOM Associations and International Centre for Dense Magnetised Plasmas (ICDMP- IPPLM) organized the 10th Kudowa Summer School "Towards Fusion Energy", in Kudowa Zdroj, Poland, on June 14-18, 2011.

The school is designed for young scientists from different countries, and it concerned mainly various aspects of a fusion energy, plasma experiments, and technology. During special sessions the participants presented short talks about their research activities.

The 10th Kudowa School was governed by Dr Jef Ongena (EFDA, Cullham, U.K.).

For young participants from developing countries a limited financial support from LOC was available.

Topic of the Kudowa Summer School:

- Fusion energy
- Magnetic Confinement Fusion
- ICF Fusion, Principles and Experiments
- Fusion Technology
- Plasma Diagnostic Techniques.

Proceedings

The reviewed Contributions of the participants and invited speakers of the 10th Kudowa Summer School have been published in *Nukleonika*.

12 Seminars and lectures

Seminars at IPPLM

20.01.2011 - Wojciech Dominik (Warsaw University): Micro-pattern gas detectors

27.01.2011 - Vladimir Gribkov (IPPLM): Recent results on the DPF use in radiation material sciences intended for the main-stream fusion researches

2.02.2011 - Paweł Gąsior (IPPLM): Erosion and deposition diagnostics and fuel removal from in-vessel components of thermonuclear reactors in relation to plasma-wall interaction studies

10.03.2011 - Oldrich Renner (Institute of Physics Cz.A.S., Prague): X-ray spectroscopy of hot dense plasmas: from basic principles to advanced applications

28.04.2011 - Włodzimierz Stępniewski (IPPLM): Application of the free point method to model the dynamics of plasma in PF and x-pinch systems

12.05.2011 - Norbert Meyer (Poznań Supercomputing and Networking Centre): Organization and review of activities

26.10.2011 - Tomasz Pławski: 12 GeV project for CEBAF accelerator in the Jefferson Laboratory

29.11.2011 - Monika Kubkowska (IPPLM): Projects of diagnostics of soft X radiation prepared for W7-X stellarator

7.12.2011 - Frantisek Dubecký (Institute of Electrotechnics, Bratislava): Semiconductor detectors for soft X-ray spectroscopy in hot plasmas diagnostics: identification, actual results and prospect.

Seminars of the Plasma Physics Section of the PAS Physics Committee

5.02.2011 - Tadeusz Pisarczyk (IPPLM): Generation of plasma jets and laser-driven macro-particle acceleration with reference to ICF and astrophysical research.

15.03.2011 - Tomasz Chodukowski (IPPLM): Study of plasma dynamics and parameters in PF-1000 device during formation and break-up phases by means of multi-frame laser interferometry.

17.05.2011 - Jacek Kurzyna (IPPLM): Progress in research on Hall plasma accelerators.

18.10.2011 - Jerzy Wołowski (IPPLM): Study and applications of ions generated by laser pulses.

15.11.2011 - Andrzej Gałkowski (IPPLM): ITER project and the European nuclear fusion programme: current status.

13 Public Information

1) Participation in outreach and public events (Educational Project for Science teachers and students – continuation):

- Competition for Secondary and High School students testing knowledge of nuclear physics and fusion – organized during the all school year 2010-2011 with the help of teachers participating in 'Fusion at school' project. Three stages – school, regional and national – over 200 students from about 90 schools took part in the competition, 44 students reached the central, national level of the competition and 20 winners received the winning prize that is four-day training course in Greifswald;
- Three-day training course on the basic plasma physics in the Institute of Plasma Physics and Laser Microfusion in Warsaw in 26-28 May 2011 – 91 participants: 47 science teachers of secondary and high schools from all Poland and 44 students – winners of the regional competitions. Apart from lectures and competition test for students, the programme included also visits to the IPPLM laboratories. The lecturers were mostly scientists from the IPPLM but also some of them were invited from other nuclear institutes in Poland. There was also one representative from EFDA-JET, Jef Ongena who presented a lecture about global energy problems;
- Visiting the Institute of Plasma Physics in Greifswald (with the W7-X stellarator) – 21-24 September 2011 – 20 students, winners of the national competition, with their teachers (48 people altogether) from all over Poland. Apart from W7-X stellarator, the participants visited the Department of Physics of the University in Greifswald and the Leibniz Institute for Plasma Science and Technology. In each place, the programme consists of theoretical lectures, observing experiments (at the students faculties of the university) and visiting laboratories;
- Preparing materials for teachers:
 - translation of the article about fusion;
 - articles written by Polish scientists;
 - printing leaflets, brochures.
- Distributing materials among teachers in Poland – February, May, September.
- Helping teachers in organizing fusion competitions in their schools and regions.
- Participating in the XV Science Festival in Warsaw, September 2011.
- Theatre GO Meta-Physical Laboratory – continuation of cooperation:
 - The project 'Art of Science' for children from Primary Schools and young students from secondary and high schools (aged 9-18 years) – the programme has had a few versions for different age groups/matched/adapted/adjusted to the age of the participants. It is a theatre spectacle played next to the main IPPLM facility, Focus 1000 – the students participate directly in the artistic-scientific programme together with actors and scientists. The first edition of the project took place in 21-25 November 2011, the next is planned in the year 2012;
 - The all-year programme 'Education through Art' - performances and presentations of achievements of modern science especially related to fusion and global energy

challenges in the institute and the schools from Warsaw and the region. In the year 2011, more than 3000 students participated in the programme.

2) Contributions to EFDA PI Activities:

- Translating materials from EFDA;
- Annual meeting of PI group in Greifswald in 16-17 June 2011:
 - Informative, educational and very useful meeting with people from different European associations, who work in the field of Public Information in their countries. Exchange of ideas and reciprocal stimulation;
 - Presenting educational activity of our Association during all the year. Presentation about educational project for Secondary and High School Science teachers created, organized and carried out by the Polish EURATOM Association;
 - Discussion how to emphasize Polish contribution in fusion programme in Europe (and generally scientific) – the meeting took place just before the beginning of the Polish presidency in European Union (July-December 2011).

3) Production of films, brochures, websites, etc.:

- The brochure ‘35 years of research for future generation’ written in order to present the work and achievements of the institute IFPiLM during its 35 years of existence – in electronic and printed versions;
- Producing brochures in Polish from articles translated from Science in School, EFDA and from the articles written by Polish scientists:
 - translating materials connected with fusion (from European Commission);
 - writing articles about the fusion project for Polish schools in the magazine for teachers.
- Introducing a new IPPLM website www.ifpilm.pl – September 2011:
 - new design, wider range;
 - connections to websites of the organizations within the institute;
 - links to the institute collaborators;
 - updating information presented on the website.
- Updating the website of National Contact Point with the section of education:
 - information about summer schools;
 - informative documents for teachers engaged in the educational project;
 - materials for teachers to use in the classroom;
 - lectures, presentations from teacher training meeting in IPPLM and the courses abroad (pdf documents, power point presentations, photos).

4) Press releases, journal articles, electronic media, radio broadcast:

- Articles presenting the research programme in the IFPiLM institute ‘Harnessing the energy of stars; Poland contributes to research to make fusion energy available on Earth’ by Andrzej Gałkowski published in Public Service Review: European Union, Issue 21, March 2011; ‘Laser-matter interaction and laser induced fusion’ by Jerzy Wołowski published in Public Service Review: European Union, Issue 22, July 2011; ‘Plasma-Focus research’ by Marek Scholz published in Public Service Review: European Union, Issue 22, July 2011;

- Article 'New source of energy; IFPiLM leader of fusion research in Poland' In the newspaper Gazeta Prawna; research institutes, March 2011;
- Article 'Physics is fun' describing the beginning and development of the project carried out by the IPPLM Association, called 'Fusion at school'. The article written by Helena Howaniec, has been published in the first issue of 'Fusion in Europe', April 2011;
- Articles in schools journals and websites about students competition and about the visit of teachers and students in Greifswald;
- Radio broadcast on Polish local radio channels before and during the students competitions;
- An interview with the Director of IPPLM Andrzej Gałkowski done by a student from IV High School in Katowice – published in the school newspaper and the IPPLM website, May 2011;
- A celebration of the jubilee of the Institute of Plasma Physics and Laser Microfusion "35 years of research in IPPLM" – numerous politicians and journalists participated, 31st September 2011;
- Article 'The institute of high power and high temperature' – interview with the director of one IFPiLM department Lesław Karpiński, October 2011;
- Radio broadcast on Polish national channel 'Science evening with TV' – interview with 3 scientists from IFPiLM: Andrzej Gałkowski, Marek Scholz, Łukasz Ciupiński – October 2011;
- Publishing two articles in AlphaGalileo about the institute achievements; October 2011; next followed publishes in many Polish and world science services:
 - Krypton Hall effect thruster for space propulsion, author Jacek Kurzyna;
 - Laser ion source will produce a new generation of semiconductors, author Jerzy Wołowski.

Index

A

Adams, J. · 51
Agarwalf, A. · 94
Aggarwal, K.M. · 95
Aglitskiy, Y. · 77
Ameen, M. · 94
Amiranoff, F. · 96
Ando, L. · 100, 101, 102
Anghel, M. · 51, 98
Antonelli, I. · 98
Antonelli, L. · 85
Argouarch, A. · 98
Arikawa, Y. · 77
Arnoux, G. · 96
Atzeni, A. · 82, 97
Azечи, H. · 77, 82

B

Badziak, J. · 9, 10, 11, 27, 29, 73, 77, 82, 85, 94, 96, 97, 98, 100, 101, 102, 103
Balshaw, N. · 98
Baranov, Yu.F. · 51
Barnes, C. · 64
Barnsley, R. · 51
Barral, S. · 11, 67, 72, 97, 100, 101, 103
Barreca, F. · 94
Bartirromo, R. · 56
Batani, D. · 85, 97, 98
Bates, J.W. · 77
Baton, S.D. · 96, 98
Bayliss, S.C. · 94
Beaumont, P. · 98
Beltsiosb, K. · 94
Ben Assayag, G. · 94
Berczyński, P. · 96
Bertalot, L. · 51, 64
Betti, R. · 87
Bieda, M. · 97
Biedermann, C. · 35, 100
Bieńkowska, B. · 11, 64, 95, 98, 101
Blackman, T. · 98
Blagoev, A. · 100
Blanchard, P. · 52, 98, 99
Blanchot, N. · 96
Bobkov, V. · 96, 98
Boháček, P. · 97
Bonafos, C. · 94
Boody, F.P. · 94
Borodziuk, S. · 11, 27, 29, 73, 77, 82, 97, 100, 101, 103
Bravo, E. · 29
Brayer, C. · 72
Breil, J. · 97
Brennan, D. · 98
Brett, A. · 98

Brezinsek, S. · 97
Brix, M. · 96
Bronson, F.L. · 64
Burhenn, R. · 35, 100

C

Calabro, G. · 98
Canaud, B. · 96
Caridi, F. · 94
Carrada, M. · 94
Ceconello, M. · 98
Cecil, F.F. · 51
Chanteloup, J.C. · 96
Chassainga, D. · 94
Chaurasia, S. · 96
Cherfils, C. · 96
Chernyshova, M. · 11, 52, 98, 99, 100, 102
Chicutin, A. · 102
Chodukowski, T. · 11, 27, 29, 73, 77, 85, 95, 96, 97, 98, 100, 101, 102, 103, 111
Cikhardt, J. · 99
Ciupiński, Ł. · 115
Claverie, A. · 94
Coad, P. · 96
Coffey, I.H. · 95, 98, 99
Coffind, H. · 94
Colas, L. · 96, 98
Congedo, G. · 94
Conroy, S. · 51
Coyne, A. · 98
Craciunescu, T. · 49, 51, 98
Crespo, M. · 102
Crombe, K. · 98
Currò, G. · 94
Curuia, M. · 49, 51, 98
Czarnecka, A. · 9, 10, 11, 20, 31, 35, 40, 94, 95, 96, 98, 99, 100, 101, 102
Czarski, T. · 11, 52, 99, 100
Czaus, K. · 96, 99
Czyrkowski, H. · 52, 99

D

Dalimier, E. · 97
Daniłko, D. · 11, 67, 72, 99, 101
Davies, J.R. · 97
Dąbrowski, R. · 52, 99
Debayle, A. · 97
Debras, G. · 96
Degnan, J. · 82
Demchenko, N.N. · 29, 97, 98, 100, 101, 102
Demina, E.V. · 95, 98, 99, 102
Denlinger, J.D. · 98
Depierreux, S. · 96
Derkachov, G. · 98
Dhareshwar, L.J. · 96

Dimitrakisa, P. · 94
Dodt, D. · 96
Domagala, J.Z. · 98, 102
Domański, J. · 11
Dominik, W. · 9, 52, 99, 100, 111
Dorchies, F. · 98
Dousse, J.-Cl. · 96, 97
Drake, R.P. · 82
Drozdowicz, K. · 64, 95, 102, 103
Dubecký, F. · 97, 111
Dubrovsky, A.V. · 95, 98, 99, 102
Dudeck, M. · 72, 97, 101
Dumont, R. · 98
Durodie, F. · 96, 98
Dworak, D. · 102, 103

E

Ebrardt, J. · 96
Edlington, T. · 51, 98
Edwards, C.B. · 96
Ekedahl, A. · 96
Ekinci, Y. · 94
Eliezer, S. · 29
Esirkepov, T. · 82
Esposito, B. · 64

F

Fazio, E. · 89, 94, 101, 102
Felton, R. · 98
Feugeas, J.L. · 97
Figacz, W. · 31, 35, 100
Figueiredo, C.A. · 99
Finstad, T.G. · 94
Fiuza, F. · 97
Fonseca, R.A. · 97
Fourment, C. · 98
Frigione, D. · 96, 98
Friichtenicht, J.F. · 82
Fundamenski, W. · 96, 97
Fursdon, M. · 96

G

Gabańska, B. · 102
Gaffka, R. · 95
Galant, G. · 96
Galster, W. · 82
Gałkowski, A. · 4, 8, 9, 10, 11, 96, 100, 111, 114, 115
Garcia, C. · 29
Garkusha, I.E. · 95, 99
Gauthier, E. · 96
Gąsior, P. · 9, 11, 20, 40, 89, 94, 97, 99, 100, 101, 102, 111
Gherendi, M. · 49, 51, 98
Giroud, C. · 97, 98
Giuffrida, L. · 89, 94, 100, 101, 102
Gizzi, L.A. · 97, 98

Glenzer, S.H. · 82
Goniche, M. · 96
Gonzalez, M. · 29
Graham, M. · 96, 98
Gremillet, L. · 98
Gribkov, V. · 11, 95, 98, 102, 103, 111
Gryaznevich, M. · 95
Guennes, A. · 94
Gupta, N.K. · 96
Guskov, S.Yu. · 29, 97, 100, 102

H

Hallo, L. · 97
Havlíčková, E. · 96
Hawkes, N.C. · 51
Hellesen, C. · 98
Hellsten, T. · 98
Hemingway, J.D. · 64
Hemmers, O. · 98
Hill, K.W. · 56
Hitschfel, J. · 95
Holkundkar, A.R. · 96
Honrubia, J.J. · 97, 98
Horáček, J. · 96
Hoszowska, J. · 96, 97
Howarth, P.J.A. · 51
Hulin, S. · 98
Huran, J. · 97
Huygen, S. · 98

I

Ingesson, L.C. · 51
Ivanova-Stanik, I. · 11, 13, 16, 95, 98

J

Jabłoński, S. · 11, 31, 35, 77, 82, 97, 100, 101, 102, 103
Jacquemot, S. · 96
Jacquet, P. · 96, 98
Jakubowska, K. · 9, 11, 52, 56, 95, 96, 99, 100, 101
Jarvis, O.N. · 51
Jednoróg, S. · 11, 44, 49, 56, 64, 95, 101
Joffrin, E. · 96
Johnson, T. · 51, 98
Junghans, C. · 35
Jungwirth, K. · 96
Juraszek, D. · 96

K

Kaczmarczyk, J. · 11, 31, 35, 72, 97, 100, 101
Kalinowska, Z. · 11, 27, 73, 77, 85, 95, 96, 97, 98, 100, 101, 102, 103
Kanaya, M. · 94

Kanemitsu, Y. · 94
Kapetanakis, E. · 94
Karasik, M. · 77, 82
Karpiński, L. · 9, 10, 11, 52, 65, 95, 96, 98, 99, 100, 115
Kartopu, G. · 94
Kasperczuk, A. · 11, 27, 29, 73, 77, 96, 97, 100, 101, 102, 103
Kasprowicz, G. · 52, 56, 99
Keenan, F.P. · 95
Kierzkowski, K. · 52, 99
Kiptily, V.G. · 51, 98
Klimo, O. · 87, 97
Klimor, G. · 64
Klir, D. · 95, 96, 97, 98, 99, 101
Kłos, Z. · 9
Kneupner, K. · 51, 98
Knipe, S. · 98
Koenig, M. · 96, 98
Koester, P. · 85, 97, 98
Kolobov, A.V. · 94
König, R. · 35, 100
Korotkov, A. · 96
Kortanek, J. · 95, 98
Kowalska-Strzęciwilk, E. · 11, 64, 95
Kozioł, K. · 96, 97
Kozlova, M. · 98
Krása, J. · 94, 96, 97, 102
Krasilnikov, A. · 98
Krauz, V. · 65
Kravarik, J. · 95, 96, 97, 98, 99, 101
Krouský, E. · 29, 73, 77, 85, 96, 97, 100, 101, 102
Kruer, W. · 87
Kubes, P. · 65, 95, 96, 97, 98, 99, 101
Kubkowska, M. · 9, 10, 11, 20, 31, 35, 40, 95, 96, 97, 99, 100, 101, 102, 111
Kucharik, M. · 77, 85, 100
Kudla, I.M. · 99
Kurzyńska, J. · 11, 67, 72, 97, 99, 101, 103, 111, 115
Kwiatkowski, R. · 96

L

Laas, T.I. · 98
Labate, L. · 97, 98
Labaune, C. · 96
Ladygina, M. · 95, 96, 99
Lafitte, S. · 96
Lafon, M. · 97
Lamalle, P. · 98
Lancaster, K. · 98
Láska, L. · 94, 96, 97, 102
Lawniczak-Jabłońska, K. · 98, 102
Lawson, K.D. · 51, 95
Laxaback, M. · 98
Ledingham, K.W.D. · 82
Lemke, R.W. · 82
Lengar, I. · 51, 98
Lennholm, M. · 98
Lerche, E. · 96, 98, 99
Lewandowska, M. · 9

Lisak, M. · 96
Liseykina, T.V. · 82
Liska, R. · 77, 82, 85, 100
Litseva, E. · 95
Loarte, A. · 98
Loiseau, P. · 96
Lorusso, A. · 94, 96
Louglin, M. · 64
Lovergine, N. · 94
Lyakhovitsky, M. · 102

M

Macchi, A. · 82
Maddison, G. · 97
Maeda, Y. · 94
Maggiora, R. · 98
Mailloux, J. · 96
Malinowski, K. · 95, 96
Mantsinen, M.J. · 51
Marchenko, A.K. · 96
Marcus, F.B. · 51
Marczyński, S. · 96
Margarone, D. · 97
Martinez-Val, J.M. · 29
Marx, G. · 85
Masek, K. · 29, 77, 97, 101
Maslov, M. · 98
Maslyayev, R. · 95, 98, 99, 102
Masuda, K. · 94
Mayoral, M.-L. · 96, 98
McInnes, C.R. · 85
Meeker, D.C. · 72
Messiaen, A. · 98
Meyer, N. · 82, 111
Meyer-ter-Vehn, J. · 82
Mezzasalma, A.M. · 89, 94, 101, 102
Michel, D.T. · 96
Miedzik, J. · 11, 67, 72, 97, 100, 101
Miklaszewski, R. · 9, 11, 95, 99, 101, 102, 103
Milanesio, D. · 98
Minikayev, R. · 98, 102
Miquel, J.L. · 96
Mishra, G. · 96
Mohr, S. · 35
Monakhov, I. · 96, 98
Morace, A. · 98
Murakami, M. · 29, 77, 82
Murari, A. · 48, 51, 56, 64, 95, 98

N

Nadrowski, P. · 10
Nassisi, V. · 94, 96
Naulin, V. · 96
Nawrocik, W. · 9
Nazarov, W. · 98
Nečas, V. · 97
Neely, D. · 98

Nejdl, J. · 98
Neri, F. · 94
Neu, R. · 97
Nicolai, P. · 98
Nielsen, A.H. · 96
Nightingale, M. · 98
Nishitani, T. · 64
Noble, C. · 96, 98
Nocente, M. · 98
Normand, P. · 94
Normandb, P. · 94
Norreys, P. · 96

O

Obenschain, S.P. · 77
Ogando, F. · 29
Oh, J. · 77
Oliva, E. · 29
O'Mullane, M.G. · 95, 97
Ongena, J. · 96, 98, 99, 110, 113
Otani, K. · 82

P

Paduch, M. · 9, 11, 37, 49, 65, 95, 96, 98, 99, 101
Panfil, R. · 10
Pangioni, L. · 98
Pantea, A. · 51
Parys, P. · 11, 77, 85, 89, 94, 96, 97, 100, 101, 102, 103
Pasley, J. · 98
Pełka, G. · 11
Peradzyński, Z. · 9, 100
Perez, F. · 96, 98
Pericoli, V. · 97
Perkins, L.J. · 87
Perlado, J.M. · 29
Petrzilka, V. · 96
Pfeifer, M. · 29, 73, 77, 94, 96, 97, 100, 101, 102
Philippe, F. · 96
Picciotto, A. · 97
Pimenov, V.N. · 95, 98, 99, 102
Pisarczyk, P. · 29, 77, 96, 97, 100, 102
Pisarczyk, T. · 9, 10, 11, 27, 29, 73, 77, 85, 95, 96, 97, 98, 100, 101, 102, 111
Pisarek, M. · 94
Piskorska-Hommel, E. · 98, 102
Pluta J. · 9, 10
Pławski, T. · 111
Pokorska, A. · 4
Polasik, M. · 96, 97
Popovichev, S. · 48, 51, 56, 64, 95
Portafaix, C. · 96
Pozniak, K. · 52, 56, 99
Prete, P. · 94
Prior, P. · 51, 98
Prokopowicz, R. · 11, 49, 64, 95, 102
Prokupek, J. · 97
Proverbio, I. · 98

Pytel, K. · 64, 95, 102

R

Rapp, J. · 19, 97
Rączka, P. · 11, 77, 82, 99, 100, 101, 102, 103
Relano, A. · 29
Renner, O. · 97, 111
Rezac, K. · 95, 96, 97, 98, 99, 101
Ribeyre, X. · 87, 97, 98
Riccardo, V. · 96
Richetta, M. · 98
Righi, E. · 51
Rimini, F. · 96, 98
Robinson, A.P.L. · 82
Rohlana, K. · 29, 73, 77, 94, 96, 97, 100, 101, 102
Romanelli, F. · 64
Roquemore, A.L. · 64
Roschupkin, V. · 102
Rosiński, M. · 9, 10, 11, 77, 85, 89, 94, 100, 101, 102, 103
Rousseaux, C. · 96
Rubel, M. · 10
Rus, B. · 29, 97, 98
Ryć, L. · 11, 31, 35, 95, 96, 97
Rzadkiewicz, J. · 11, 37, 52, 95, 96, 97, 99, 100, 103

S

Sadler, G.J. · 51
Sadowski, M.J. · 9, 11, 65, 95, 96, 99, 109
Sakaiya, T. · 77
Salapa, Z. · 52, 99
Sanders, S. · 51, 98
Santos, J.J. · 97, 98
Sasinovskaya, I.P. · 98, 102
Schiavi, A. · 97
Schlenvoigt, H.P. · 96
Schmitt, A.J. · 77, 87
Scholz, M. · 10, 11, 37, 48, 49, 52, 56, 64, 65, 95, 96, 98, 99, 100, 101, 102, 115
Schurtz, G. · 97, 98
Seidl, J. · 96
Serincan, U. · 94
Sharapov, S.E. · 51
Shcherbakov, V.A. · 87
Sieczkowska, E. · 10
Silva, L.O. · 97
Simmons, J.F.L. · 85
Sirinelli, A. · 96
Skala, J. · 29, 73, 77, 96, 97, 100, 101, 102
Skarlatosa, D. · 94
Składnik-Sadowska, E. · 95, 96, 99
Skrzeczanski, W. · 100, 101
Stabkowska, K. · 96, 97
Smid, M. · 97
Soare, S. · 51, 98
Sohlf, Ch. · 94
Soncini, V. · 94
Sozzi, C. · 98

Spadaro, S. · 94
Speaks, D.T. · 98
Spindloe, Ch. · 85, 98
Stamp, M. · 97, 98
Stankiewicz, R. · 11, 13, 16, 19
Starosta, J. · 96, 97
Start, D.F.H. · 51
Stefanescu, I. · 98
Stehle, Ch. · 29
Stępniewski, W. · 11, 111
Stolte, W.C. · 98, 102
Stork, D. · 51
Studholme, W. · 98
Syme, B. · 51, 64, 95, 98
Szydłowski, A. · 44, 64, 95, 101

T

Tanaka, K. · 94
Tardocchi, M. · 98
Telesca, G. · 97
Temporal, M. · 97, 100
Tereshin, V.I. · 95
Thornhill, T.F. · 82
Tikhonchuk, V. · 97
Tiseanu, I. · 51
Tolley, M. · 98
Tomaszewski, K. · 37, 95, 98, 100, 102
Torrise, L. · 89, 94, 97, 100, 101, 102
Tracz, G. · 64, 95
Tripathi, S. · 96
Tsoukalas, D. · 94
Tuniz, C. · 95, 99, 102
Turan, R. · 94
Twaróg, D. · 13
Tyliszczak, T. · 98
Tyrrell, S. · 52, 99

U

Ugaste, E. · 98
Ullschmied, J. · 29, 73, 77, 85, 94, 96, 97, 100, 101, 102

V

Van Belle, P. · 51
Van Eester, D. · 98, 99
Van Oost, G. · 97
Vauzour, B. · 98
Vdovin, V. · 98
Velarde, P. · 29
Velardi, L. · 94, 96
Velikovich, A.L. · 77

Velyhan, A. · 96, 97
Venkataraman, R. · 64
Versloot, T.W. · 98
Vizvary, Z. · 96
Volpe, L. · 98
Vrancken, M. · 98

W

Walukiewicz, W. · 98
Warrick, C.D. · 51
Watari, T. · 77
Watkins, N. · 51
Weaver, J.L. · 77
Weller, A. · 35, 100
Whitehurst, A. · 98
Wiącek, U. · 102, 103
Widdowson, A. · 96
Wolfe, T.R. · 82
Wołowski, J. · 4, 7, 10, 11, 31, 35, 85, 89, 94, 96, 97, 98, 99,
100, 101, 102, 103, 109, 111, 114, 115
Wooldrige, E. · 98
Woźnicka, U. · 7, 9
Wrochna, G. · 10

Y

Yamaguchi, T. · 98, 102
Yamamoto, M. · 94
Yavorskij, V. · 51
Young, B. · 64
Yu, K.M. · 29, 51, 97, 98, 100, 101, 102

Z

Zabolotny, W. · 52, 99
Zacks, J. · 95
Zagórski, R. · 9, 10, 11, 19, 96, 97
Zalesak, S.T. · 77
Zaleśny, J. · 96
Zastrow, K.Z. · 52, 56, 95, 96, 99, 100
Zatko, B. · 97
Zawadka, A. · 102
Zielińska, E. · 11, 37, 95, 98, 99, 101
Ziółkowski, A. · 9
Zoita, V. · 49, 51, 98
Zurbach, S. · 72, 101

Ż

Żebrowski, J. · 96, 99

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