

6 Training and career development, Public Information

▪ International Conference PLASMA-2013 Research and Applications of Plasmas, 2-6.09.2013

The international conference PLASMA-2013 was organized by the Local Organizing Committee created at IPPLM. The Polish Physical Society was the co-organizer of this venture. More than 140 participants from various countries declared the participation in PLASMA-2013. The International Scientific Committee invited more than 20 recognized specialists from Poland and abroad to give an oral presentation. The Ministry of Science and Higher Education supported the organization of the conference with a special subsidy. Several Polish and foreign private companies sponsored the conference presenting their scientific equipment.

The PLASMA conferences have been organized since 1993 mainly in Poland. In 2007 the conference took place in Germany and in 2010 – in France. The main goal of the next PLASMA conferences is to create a scientific forum for detailed discussion and evaluation of progress in research of plasma physics and plasma technology as well as thermonuclear fusion. The majority of presented works is performed in the framework of the international cooperation, most frequently covered by the European programmes. The conference has been considered an important international scientific event of exceptional importance for scientific communities in Eastern and Western Europe. It facilitates the meetings of young scientists with experienced researchers from renowned centres in Poland and abroad.

The total number of participants (including 11 IPPLM scientists) amounted to 131 persons from 24 countries. The invited lectures were presented by 18 distinguished researchers and oral presentations (2 of them by IPPLM scientists - P. Gąsior and M. Kubkowska) were delivered by 24 participants. Moreover, 90 posters (10 from IPPLM) were put on display and discussed. The conference participants took part in a trip to Wilanów Palace, which was built for the Polish king Jan III Sobieski in the last quarter of the 17th century, and enjoyed it immensely.

▪ 14th International Workshop on Plasma edge Theory in Fusion Devices, 23-25.09.2013

The 14th International Workshop on Plasma Edge Theory in Fusion Devices was organized by IPPLM, EURATOM Association and Polskie Towarzystwo Fizyczne (Polish Physical Society). Like all the preceding workshops, the subject of that year's workshop was plasma theory of the edge region in magnetic confinement fusion devices (invited and contributed presentations included basic edge plasma theory, models of special phenomena and edge control, and integrated edge plasma modelling). Current status of the theory for the boundary layer of fusion plasmas was presented. The emphasis was laid on the development of theory and of appropriate numerical methods, with a secondary interest in self-consistent modeling of experimental data (including also empirical elements).

The workshop consisted of invited lectures, oral presentations and poster contributions. Contributed papers were mainly presented as posters.

The participants accounted for 59 persons from 12 countries.

▪ Participating in the XVII Science Festival in Warsaw, 20-29 September, 2013

The idea of the Science Festival originated in September of 1996. Originally, 72 meetings were held within 2 days at 44 research institutes and organizations. In the subsequent years, the project has developed significantly. Over 100 research institutes propose festival activities. Some events during the Festival remain invariable from year to year: clubs and discussions, weekend meetings such as laboratory presentations for a limited number of participants (they are delivered in the form of

presentation and can be accompanied by lecture) and festival lessons on weekdays mainly for primary or secondary school students.

Lectures on the IPPLM side referred to nuclear fusion as a solution for energy problems in the world, laser-plasma interaction as a source of fast particles, satellite plasma thrusters, Sun on Earth, laser acceleration of particles and others. After lectures delivered by physicians with doctor degrees, participants had a chance to visit laser laboratories and PF-1000 device, as well as take part in hands-on experiments in relation to radiation.

In total, six classes from junior and high schools (150 persons in total) participated in the festival lessons on weekdays and around 70 persons of various age joined IPPLM during weekends.

▪ Visits of students

The students from the Department of Physics of Warsaw University (April) and the students from the Department of Physics of the Warsaw University of Techno (December) visited IPPLM to attend a lecture of P. Gąsior dealing with thermonuclear energy. Participants had a chance to see the PF-1000 device, 10TW laser laboratory as well as PlanS.

Around 50 persons (two classes) from LXIII High School named after L. Kossuth visited IPPLM in March. M. Paduch conducted a lecture on thermonuclear fusion and tokamaks, W. Stępniewski described the functioning of PF-1000 device, and scientists proposed a tour of the PlanS laboratory.

▪ Press release, web page publications, distribution of materials, organising informative meetings, public lectures

Opening of the Hall thruster laboratory called PlanS to examine plasma propulsion techniques for satellites and space probes (newsletter) – January 2013

Participation of Prof. J. Wołowski in the scientific and technical conference “Science and technology in the context of challenges in the construction of the nuclear plant” and presenting the topic called “Laser fusion as a future energy source” – February 2013

Participation of Prof. J. Wołowski and Dr. M. Paduch at the meeting in the National Information Processing Institute devoted to the possibilities of selling of the research results of the scientific institutes as a result of cooperation of science and economy given their problems and challenges – April 2013

Meeting with the participation of IPPLM researchers at Warsaw University devoted to the perspectives of thermonuclear fusion research – May 2013

Article in Bemowo News – “Physics right around the corner” describing activities taking place at IPPLM, its equipment and staff – June 2013

LaserLab newsletter: “Laserlab Forum” No 15 – publication of the history of Prof. T. Pisarczyk’s access to PALS – June 2013

Membership of Prof. Jan Badziak in the Programme Committee of the EPS Plasma Physics Conference 2013, Finland, Helsinki - June/July 2013

Article in Przegląd Techniczny (Technical Review): “An engineer designs the future” – information about the participation of IPPLM researchers in the Second Convention of the Polish Engineers – July 2013

Article in Rzeczpospolita: “The power of the Sun will be released on Earth” – information about IPPLM as a participant of the ITER project aiming at the construction of the thermonuclear reactor in Cadarache (France) – July 2013

Annual Meeting of the International Scientific Committee of an International Centre for Dense Magnetised Plasmas held to discuss the accomplished goals within the activities at PF-1000 and laboratories in frame of ICDMP and define the scope of works for the future – September 2013

Article in Quality News: “Development and modernization of the High Power Laser laboratory at IPPLM” – September 2013

Article in Fusion in Europe No 2/2013: “A fruitful collaboration between neighbours” – devoted to the contribution of IPPLM into the construction of W7-Xstallarator in Greifswald (Germany) through two systems of X-ray diagnostics – September 2013

Membership of Prof. Jerzy Wołowski in the Scientific Committee of the Plasma Physics by Laser and Applications 2013 Lecce - October 2013

Article in Gazeta Echo and Kronika Miasta Stołecznego Warszawy: „Only at Bemowo – Art and science together” – depicting Teatr GO and its collaboration with IPPLM to promote art. And science among young people

Presentation in Multimedia “Województwo Mazowieckie – Serce Polski” (issued by Negatyw Sp. z o.o.): article „Sylwester Kaliski Institute of Plasma Physics and Laser Microfusion – Mazovian center of research for the future” (in print)

Newsletter regarding the operation of launching the prototype of the first Polish plasma thruster – December 2013

▪ **Collaboration with Teatr GO located on the premises of IPPLM**

Metaphysical workshops called The Fifth State of Matter as well as The Theatre of Science were organized by Teatr GO in 2013 with growing popularity. Children as well as junior and high school students, when taken aback by the new technology, want to understand the phenomena in nature. That is why they have visited IPPLM, talked to scientists, invented scenarios for their plays about atoms, played jokes with scientific themes. One of the main IPPLM facility, Plasma Focus 1000, was utilized to make science more familiar to different age groups to which the lecture/explanations were provided. Thanks to the workshops, participants have built their trust in science.

▪ **PhD studies in the area of plasma physics and controlled fusion research**

PhD studies in the area of plasma physics and controlled fusion research are carried out at the National Centre for Nuclear Studies (NCBJ) in Otwock-Swierk, Poland, as regular courses for candidates with MSc or MScEE degrees. It is assumed that the PhD degree can be obtained in 3-4 years. These studies embrace:

1. Individual studies on plasma physics, including:

- Basic notions, examples of plasma appearance and its applications
- Definitions of high-temperature plasma and thermonuclear reactions
- Description of charged particles motions in plasma
- Kinetic theory of plasma
- Macroscopic, probe and corpuscular methods of plasma diagnostics
- Magneto-hydrodynamic theory of a plasma
- Microwave methods of plasma diagnostics
- Thermodynamic description of a plasma
- Optical methods of plasma diagnostics
- Classification of plasma research facilities
- Methods of the high-temperature plasma generation
- Confinement of a high-temperature plasma and design of a fusion reactor

2. Active participation in plasma experiments at NCBJ and collaborating laboratories, including:

- Assistance at various plasma experiments
- Elaboration of experimental results
- Preparation of scientific papers

3. Active participation in plasma seminars at NCBJ and other research centres, including:
 - Presentation of chosen problems
 - Presentation of results obtained during own experimental or theoretical studies
4. Individual studies of selected topics of philosophy
5. Individual studies of the English language

The PhD courses described above are supervised by Prof. Marek J. Sadowski, FInstP (UK).

In 2013 at the NCBJ there were three PhD students (R. Kwiatkowski, W. Surała and D. Załoga) studying plasma physics and controlled fusion research. In addition one PhD degree was obtained by Karol Malinowski - a young researcher from the Plasma Studies Division (TJ5) at NCBJ.

▪ **PhD studies in the area of nuclear fusion related topics at INP in Krakow**

Doctoral studies at the H. Niewodniczanski Institute of Nuclear Physics, IFJ PAN, were launched in 1984. We co-operate closely with the Tadeusz Kościuszko Cracow University of Technology and the Pedagogical University of Kraków and with the University of Rzeszów. Prospective candidates have to be university graduates with a M.Sc. degree in Physics or with a M. Eng. degree in a physics-related discipline of applied science. The studies are of four years' duration. The recruitment is performed yearly. Available subjects of study span all areas of research done at the Institute, inter alia – experimental aspects of plasma fusion research. In 2013 at the IFJ PAN there were three PhD students studying plasma physics and controlled fusion research supervised by prof. Krzysztof Drozdowicz. One of them was successfully finished.