

# ASSOCIATION EURATOM - IPPLM

ANNUAL REPORT 2009





**Association EURATOM-IPPLM**  
**ANNUAL REPORT 2009**

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# 1 Introduction

In the year 2009 IPPLM Euratom Association continued its activities in accordance with the new organizational structure and rules of financing, which were introduced in Euratom fusion programme in the previous years. The new structure and financial principles are based on the priorities agreed by CCE-FU and EFDA and also using methods like: Call for participation, Task agreements, Task forces and Topical groups.

The participation of our Association in tasks given by ITER IO and F4E are two former Article 5.1b, which were completed successfully last year. Wrocław University of Technology (WrUT) has been continuing the contract related to Review of complex cryolines – support to India DA. WrUT has also taken up a new task connected with Risk Analysis of ITER Cryogenic System. AGH University of Science and Technology received grants from F4E in relation with Nuclear Data studies/experiments in support of TBM activities, in which the following tasks are included: the first - Developing innovative 3H measurement procedure directly in LiPb and the second Conceptual design of a direct TPR measurement system without Tritium escape or with Tritium escape control.

As regards our participation in JET experimental program in 2009, 11 secondees took part in C26-C27 campaigns (in all 152 pw). We participated in diagnostics of X-ray and VUV spectroscopy, as well as neutron activation diagnostics and polarimetry. Apart from the above-mentioned diagnostics we are considering our participation in Gas Electron Multiplier Detector for X-ray Crystal Spectrometry development under JET Order. We also take part in JET Task agreements. Our tasks are: Assessment of efficiency of laser removal of fuel-inventory for mixed material samples using LIBS, Assessment of the suitability of neutron and gamma detectors in the future experiment at JET for the validation of shutdown dose rate prediction and Gamma ray cameras: neutron attenuators – GRC. It is worth emphasizing that involvement in the JET programme provides a very important platform for integration of the Polish fusion community.

Polish Association has answered EFDA Call for participation (CFP) as regards Plasma-wall interaction, which was launched in 2009. There were five tasks – three carried out by IPPLM and two by WUT in areas of dust, fuel removal, chemical erosion and transport, as well as PWI in a full-W device. WUT continued participation in Fusion materials Topical group activities related to W/steel joints and ODS ferritic steels.

As far as Task Force on ITM (Integrated Tokamak Modelling) is considered Association IPPLM is involved in developing module for impurities for the European Transport Solver. Szczecin University of Technology carries out its task, which is Global stability analyses of Alfvén and Energetic Particle Modes, in cooperation with Chalmers University in Goeteborg and IPP Greifswald. Opole University is doing its task (Stochastic techniques to the study of phenomena relevant to the physics of fusion) in cooperation with CNRS, Centre de Physique Theorique, Marseille.

Polish contribution in Wendelstein 7-X programme is considered to play a very important role in the integration of all Polish parties, that form our Association. Polish involvement in W7-X programme is quite extended, ranging from cooperation on device assembly and development of NBI system through development of several diagnostics (X-ray PHA, C/O monitor, neutron and microwave diagnostics) to structural mechanical calculations and neutron MCNP calculations.

On October 28, 2009, a Framework Agreement on co-operation between Max Planck Institute of Plasma Physics and IPPLM was signed by Guenther Hasinger and Zygmunt Skladanowski.

Regarding accompanying programme, Soltan Institute for Nuclear Studies and Poznan Politechnic are engaged in experimental research on TS, ISTOK and COMPASS tokamaks (Cerenkov detectors, SSNTD, Hall sensors). The Association continued its involvement in the IFE keep-in-touch activity.

With reference to PI we continued a wide range of activities. The most important is an educational project for secondary school teachers called ‘Fusion at school and in society’. Articles and brochures on

fusion for the general public are translated into Polish and posted on the website. We continue our cooperation with small, professional theatre GO.

In 2009 Fusion Exhibition was displayed in 4 Universities in Poland: in spring two cities in the North Koszalin and Szczecin and in autumn in Łódź (the central part of Poland) and Katowice in the South. The audience were mostly young students from secondary and high schools. From the feedback we have through teachers we know that Fusion Expo helped significantly in spreading the information widely and in getting young people more interested in fusion.

Kudowa School traditionally took place in late Summer, in 2009 it was for the eighth time. It was organised like always by Polish, Czech and Hungarian Associations and International Centre for Dense Magnetised Plasma (ICDMP). PhD students and young scientists from all Europe had opportunity to consolidate and widen their knowledge on fusion.

Finally, I would like to thank all those who contributed to the Polish Association Work programme and helped the Association to find its place in the European and worldwide fusion programme.



Andrzej Gałkowski  
Head of Research Unit

## General Information

### Association Steering Committee

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<b>Yvan Capouet</b> Head, Unit J4, “Fusion Association Agreements”, DG Research	<b>Zygmunt Składanowski</b> Director, IPPLM
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<b>Vito Marchese</b> Scientific Officer, Unit J4, “Fusion Association Agreements”, DG Research	<b>Piotr Jaracz</b> Director, Polish National Atomic Energy Agency
<b>Marc Cosyns</b> Financial Officer, Unit J5, “Finance and Administration”, DG Research	

### Association Council

#### Chairman

Krzysztof J. Kurzydłowski	Warsaw University of Technology, Poland
Michel Chatelier	CEA Cadarache, France
Maciej Chorowski	Wroclaw University of Technology, Poland
Marek Jeżabek	PAS Institute of Nuclear Physics, Poland
Thomas Klinger	Max-Planck Institute of Plasma Physics, Germany
Yuri Kravtsov	Consortium of Szczecin Universities, Poland
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Jérôme Paméla	Agence ITER France
Marek Rubel	Royal Institute of Technology, Sweden
Marek J. Sadowski	Sołtan Institute for Nuclear Studies, Poland
Zygmunt Składanowski	Institute of Plasma Physics and Laser Microfusion, Poland
Stefan Taczanowski	AGH University of Science and Technology, Poland
Michael Watkins	EFDA Close Support Unit Culham, United Kingdom
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Figure 1.1 Research Unit in Poland

### Polish representatives in the European committees relevant to fusion research and development

Consultative Committee for the EURATOM Specific Research and Training Programme in the Field of Nuclear Energy (Fusion) – CCE-FU

Andrzej Gałkowski – Head of Research Unit, IPPLM. CCE-FU Vice-chair  
Piotr Jaracz – Polish National Atomic Energy Agency  
Ryszard Miklaszewski – Institute of Plasma Physics and Laser Microfusion

Governing Board of the European Joint Undertaking for ITER and the Development of Fusion Energy (Fusion for Energy) – F4E

Łukasz Ciupiński – Warsaw University of Technology, WUT  
Leszek Grabarczyk – Ministry of Science and Higher Education

F4E Executive Committee  
F4E Technical Advisory Panel

Krzysztof J. Kurzydłowski – WUT  
Jarosław Mizera – WUT

EFDA Steering Committee

Andrzej Gałkowski – IPPLM  
Ryszard Miklaszewski – IPPLM

Industrial Liaison Officer  
High Performance Computer GB  
Inertial Fusion Energy Working Group  
Public Information Officer  
Remote Participation User Group

Maciej Chorowski – WrUT  
Sławomir Potempski – IAE  
Jerzy Wołowski – IPPLM  
Helena Howaniec – IPPLM  
Sebastian Małek – IPPLM

## EU Task Forces

Plasma-wall interaction  
Integrated tokamak modeling

Jerzy Wołowski – IPPLM  
Roman Stankiewicz – IPPLM

## EFDA Topical Groups

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MHD  
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Paweł Nadrowski – IPPLM

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Remote Participation

Helena Howaniec – IPPLM  
Sebastian Małek – IPPLM

The following part of the Annual Report contains information of a preliminary and/or tentative nature and must not be quoted in publications nor listed in abstract journals. It is the executive summary of the full annual report, summarizing activities performed by the Association EURATOM-IPPLM in 2009.  
The full annual report is available on the CD attached to this document.