1 Preface

In the year 2011, IPPLM Euratom Association has further increased its involvement in fusion science and technology with the aim to contribute strongly to the fusion development in general and in particular to the success of ITER project. Our program is focused on the priorities agreed by CCE-FU and EFDA and we have used tools like Call for participation and Task agreements in order to support research activities carried out by EFDA Task Forces and Topical Groups.

IPPLM is willing to continue its strong participation in the European fusion program and to reinforce its commitment to the DEMO design activities and ITER project.

The physics programme has been continued including projects coordinated by the EFDA Task Forces and Topical Groups and our participation in JET experiments and developments.

As far as JET is concerned, we are involved with the Gas Electron Multiplier Detector for X-ray Crystal Spectrometry development under JET Order. We also take part in JET Task agreements. Our tasks are as follow: Assessment of the suitability of neutron and gamma detectors in the future experiment at JET for the validation of shutdown dose rate prediction, The activation measurements in support of the JET neutron calibration, 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 contributed to the number of EFDA tasks related to Plasma-Wall Interaction (PWI). There were 6 tasks coordinated by the EFDA PWI Task Force in areas of dust, fuel removal, material erosion and transport. The aim of these tasks was to optimize in laboratory experiments the removal process with the use of Yb:fiber and Nd:YAG lasers, investigate a dust formation and describe material mixing and plasma-induced damages of the analysed samples by different surface analysis methods. In the frame of the EFDA Emerging Technology activities, the task on experimental studies leading to the qualification of laser induced breakdown spectroscopy (LIBS) for deposited layer removal and in vessel fuel inventory measurements for ITER was started in 2011.

The Association 2011 activities in the area of materials science and advanced materials for DEMO have been implemented via nine EFDA tasks that are grouped under three lines of research: materials modelling, development of materials and materials technology, materials characterization. These tasks have been carried out at Materials Science and Engineering Faculty, Warsaw University of Technology (WUT) and AGH University of Science and Technology (AGH).

Association IPPLM is involved in a number of tasks related to Integrated Tokamak Modelling activities. We have continued our participation in the work of ITM Task Force project IMP3 by development of physical models for impurities and neutrals, implementation of the models into numerical codes and development of numerical methods to solve the problem as well as implementation of modules on the Kepler platform. Poznan Supercomputing and Networking Center (PSNC) has continued its involvement in the ITM TF activities by supporting the workflow orchestration system (KEPLER) for fusion modelling.

Analysis of DEMO baseline concepts in the frame of EFDA PPPT programme were started in 2011 and the COREDIV code developed at IPPLM has been used to study different DEMO scenarios. Szczecin University of Technology has carried out its task on non-linear dynamics of fast ions driven modes, in cooperation with Chalmers University in Goeteborg.

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.

As regards accompanying programme, National Centre for Nuclear Research (NCBJ) is engaged in experimental research on TS, ISTOK and COMPASS tokamaks (Cherenkov detectors, SSNTD, Hall sensors). IPPLM is also continuing the physics and technology research on inertial fusion in the frame of the keep in touch activities within the Euratom programme.

Wroclaw University of Technology (WrUT) has been continuing the contract on Risk Analysis of ITER Cryogenic System and the following tasks have been performed in 2011: Scaling of safety devices (impact of Fukushima case), main cryostat risk analysis and risk analysis of He tank damage – TNT versus thermodynamic approach. AGH University of Science and Technology has carried out works in the frame of F4E grant related to Nuclear Data studies/experiments in support of TBM activities, in which the following tasks have been 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.

With reference to Public Information, we continue a wide range of activities. The most important is an educational project for secondary school teachers called „Fusion at school and society". Articles and brochures on fusion for the general public are translated into Polish language and posted on the website. We continue our cooperation with small, professional theatre GO.

The IPPLM Association participates in the EFDA SEFR Programme and in 2011 we have performed sociological task: "Scientific Practice in Fusion RTD – Distributed Cognition and Situated Problem-solving: preparation of the methodology for the study of Polish EURATOM Association".

Summer Plasma Physics and Technology School traditionally took place in Kudowa Zdroj, in 2011 it was for the tenth time. As usual, it was organized by Polish Association and International Centre for Dense Magnetised Plasma (ICDMP). PhD students and young scientists from all Europe had opportunity to consolidate and widen their knowledge in 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.

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