1 Preface

In 2012, IPPLM Euratom Association has continued its involvement in fusion science and technology programme with the aim to contribute strongly to the fusion development in general and in particular to the success of the ITER project. Our program is focused on the priorities agreed by CCE-FU and EFDA and we have used tools like a Call for participation and Task agreements to accomplish milestones defined in our work program. IPPLM is willing to continue its strong participation in the European Fusion Programme and to reinforce its commitment to the DEMO design activities and the ITER project.

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

As far as JET is concerned, we have participated in the JET experimental campaigns C28-C30 aimed at exploitation of the ILW project. Our staff was involved in the X-ray and VUV spectroscopy, neutron activation diagnostic and plasma modelling.

We are involved also in the Gas Electron Multiplier Detector for X-ray Crystal Spectrometry development under JET Order. The GEM detector has been already delivered to JET and first measurements of nickel and tungsten ions were done. We take part also in the JET Fusion Technology Programme contributing to the measurements and calculations of neutron streaming through JET Torus hall ducts. It is worth emphasizing that the involvement of our scientists in the JET programme provides a very important platform for integration of the Polish fusion community.

In 2012, the involvement of association teams in EFDA has increased significantly. We have participated in a number of EFDA tasks covering activities of different EFDA Task Forces and Topical Groups. In particular, the Polish Association has contributed to work related to Plasma-Wall Interaction (PWI). There were 6 tasks 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. The tungsten impurity release during Ion Cyclotron Resonance Heating (ICRF) operation was also investigated in the ASDEX Upgrade (AUG) tokamak. 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 has been completed in 2012.

The Association 2012 activities in the area of materials science and advanced materials for DEMO have been implemented via seven 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 the Materials Science and Engineering Faculty, Warsaw University of Technology (WUT) and AGH University of Science and Technology (AGH).

The Association IPPLM is involved in a number of tasks related to the Integrated Tokamak Modelling Task Force activities. In the frame of IMP3 project, we are involved in the works devoted to the development of physical models for impurities and neutrals, implementation of the models into numerical codes and the development of numerical methods to solve the transport problem as well as implementation of modules on the Kepler platform. The 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 and by providing direct support to the ITM users through the work of the Core Programming Team (CPT) and activities in the High Level Support Team (HLST).

Association teams are strongly involved in the DEMO activities by participation in a number of the EFDA PPPT projects related to modelling of the DEMO scenarios, novel divertor concepts, power exhaust physics or high current HTS conductors.

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

Wroclaw University of Technology (WrUT) has been continuing the studies concerning the risk analysis of the ITER cryogenic. The consequences of potential earthquake on the coupling between the tokamak and cryogenics building have been analysed. In collaboration with CERN, a methodology of mechanical testing of the ITER cable electrical insulation has been elaborated.

AGH University of Science and Technology has finished works in the frame of F4E grant related to the Nuclear Data studies/experiments in support of the 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.

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.

The IPPLM Association participates in the EFDA SEFR Programme and in 2012 we performed a sociological task: “Scientific Practice in Fusion RTD – Distributed Cognition and Situated Problem-solving: preparation of the methodology for the study of the Polish EURATOM Association”.

The main aim of the study was to characterise the discourse about nuclear energy, to depict the nuclear, and in particular, fusion energy discursive representations, to reveal main actors and objects, the reasons why fusion is positively or negatively valued, and to understand the change in the discourses occurred after the Fukushima accident.

With reference to the Public Information, we continue a wide range of activities. Articles and brochures on fusion for the general public are translated into Polish language and posted on our website. We continue our cooperation with small, professional theatre GO and organize visits of young students and pupils from junior and high schools to the IPPLM facilities.

The Summer Plasma Physics and Technology School traditionally took place in Kudowa Zdrój; in 2012 it was for the eleventh time. PhD students and young scientists from all Europe had opportunity to consolidate and widen their knowledge of 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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