

The WEST scientific program in the European spotlight

On November 25 2015, a EUROfusion Science Meeting, broadcasted all over Europe fusion laboratories, was dedicated to the scientific program of WEST.

The aim of the meeting was to share the WEST scientific program with European fusion experts, and motivate their participation to the coming call for experimental proposals, to be launched by mid-January 2016. The event took place in the JET premises (Culham, UK) during the annual meeting of the EUROfusion Work Package "Plasma Facing Components" (WP-PFC). In addition to local participants, the meeting was followed remotely by a dozen of European fusion laboratories.

As an introduction, the WP-PFC project leader, S. Brezinsek (FZJ), outlined the role of WEST as a facility to address high priority issues to prepare ITER divertor operation. The WEST project leader, J. Bucalossi (CEA), presented the status of the project. First plasma is targeted by fall 2016. The two WEST Task Force leaders, C. Bourdelle (CEA) and E. Tsrone (CEA), then described the major milestones in the field of plasma scenario development, long pulse H mode operation and plasma facing component testing. The process planned to go from the call for experimental proposals to the WEST

first campaigns was explained. As a conclusion, the technical implementation of WEST within WP-PFC was detailed by the EUROfusion Responsible Officer, ML Mayoral (EUROfusion – PMU).



WP-PFC project leader S. Brezinsek (FZJ)

For more information, please contact WEST Task Force leaders: E. Tsrone (emmanuelle.tsrone@cea.fr) or C. Bourdelle (clarisse.bourdelle@cea.fr).

Chinese ITER like mock-up qualified for WEST divertor

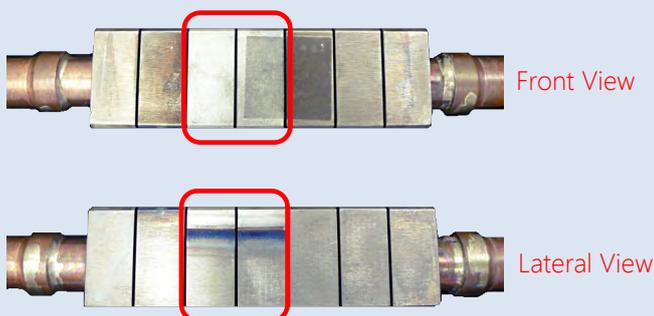
The high heat flux testing of the mock-up was a great success at 20MW/m²! The manufacturing of the full scale prototype, to be tested in tokamak harsh environment, is now launched.

A program of qualification of the ITER-like divertor Plasma Facing Units delivered by ASIPP has been launched from early 2014. The program consists of two steps: technology validation under ITER heat load requirements and full-scale prototypes testing in tokamak environment.

In the first step, the performance of the joining technologies is challenged by using small-scale W-monoblock mock-ups under cyclic surface heat fluxes up to 20 MW/m² in a high heat flux facility. In the second step, the power handling capabilities/ageing/lifetime is assessed by testing full-scale prototypes in the WEST tokamak through dedicated experiments.

MOCK-UP AFTER HIGH HEAT FLUX TESTS

500 cycles @ 20MW/m² + 1000 cycles @ 10MW/m²



The "technology validation" step was completed successfully this summer. W-monoblock small-scale mock-up was tested in the EMS-60 (SWIP/China) and in the JUDITH-1 (FZJ/Germany) electron beam facilities. The mock-up survived 1000 cycles at 10 MW/m² followed by 500 cycles at 20 MW/m² (absorbed surface heat flux) without occurrence of damage.

This very promising result has enabled to launch the second step of the program with the manufacturing of full-scale prototypes to be installed and tested in WEST tokamak from the start-up phase in 2016.

The IPR collaboration on CODAC enters a new phase

New hardware for the WEST CODAC (Control-command and Data Acquisition System) has been delivered and tested. Software development is now stepping up in view of plasma restart.

Since January 2014 the Institute of Plasma Research (IPR, India) has been sharing with CEA/IRFM the responsibility of specifying and developing the new acquisition units and the new plasma control system for WEST. Moreover, IPR provide the required hardware.

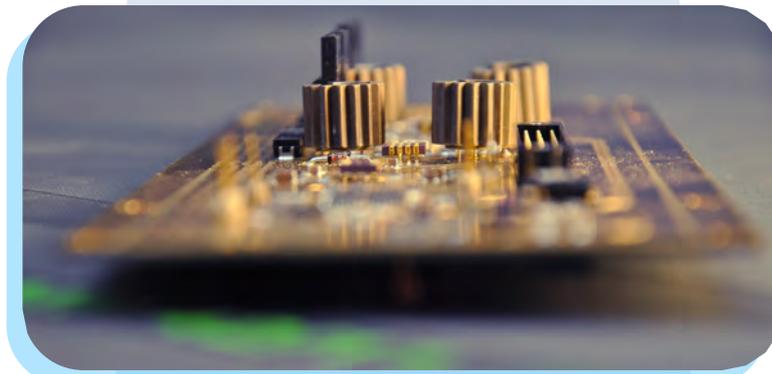
12 collaborators have spent several months at the IRFM since the beginning of this collaboration.

During the last 2 years an important effort was made to complete the detailed specifications, place the orders and perform the acceptance tests of the 18 acquisition units and the real time network.

The new acquisition units are based on PXIe chassis from National Instrument (also the supplier for ITER) and industrial PC. The work performed to develop the drivers and operate the hardware could thus be extrapolated to ITER CODAC.

Early November, the last component (bridge for the real time network) was delivered at the IRFM. This first phase was completed on time thanks to the IPR contribution, either in manpower or in hardware.

The challenge that must be addressed now is the software development of all acquisition units in less than 1 year not to miss the 1st plasma.



Again IPR and IRFM will share the effort and 4 IPR collaborators will come to IRFM in January 2016 to reinforce the team...

New milestone: Installation of the divertor coil casings

The two stainless steel rings constituting the housing for the conductor winding are now assembled and positioned inside the vacuum vessel at their nominal position.

The first step was the introduction of the 60° sectors of the lower coil casing through an equatorial port, their fixing to the raised divertor supporting legs, their bolting together and finally the tight welding of the sectors. The 8 400 kg ring and its 12 legs were then lifted up and docked to the lower chairs fixed on the arms of the magnetic iron circuit outside the vacuum vessel. The same operations were carried out for the upper coil casing. In addition, the upper stabilizing coil sectors had to be brazed together inside the vacuum vessel and fixed to the casing before fixing the upper legs and lifting up the ring to its final position. The building of the coil winding can now be started.



PICTURE OF THE DAY

Inside WEST Vacuum Vessel
Franck Samaille (left) & Jérôme Bucalossi (right)
inspecting the upper coil casing & stabilization coil.
04 december 2015