

## International fusion community mobilized for WEST

This summer, the 1<sup>st</sup> WEST international workshop gathered 120 scientists in Aix en Provence. The objective of this three days meeting was for the participants to contribute to the scientific program. Discussions were very fruitful and number of new proposals will enrich the WEST research plan.

The workshop was held from 30 June to 2 July, in Aix en Provence, at the Aix Marseille University which co-organized the workshop, and at Cadarache for the last day with a visit of WEST and ITER worksites. The workshop was supported by the "Communauté du Pays d'Aix" who offered the beautiful Granet Museum premises for the Welcome Reception.



G. Fioni, CEA-DSM Director, opening the workshop

The meeting started with the requests of ITER Organization and domestic agencies in charge of procuring the ITER divertor targets. The

EUROfusion representative introduced how WEST will be inserted as a new facility within the European fusion programme.

General presentations of the WEST project by the IRFM team followed.

The second day was devoted to parallel working sessions along topical headlines: the start-up phase, the testing of ITER tungsten plasma facing component, the long pulse H-mode operation, the session on exploring high particle fluence and the last one related to advanced tokamak modes. These discussions were summarized by the chairs of the working sessions on the 2<sup>nd</sup> of July. All of these outputs will be integrated to update the WEST research plan.



B. Ely, Chief Curator of the Granet Museum, during the visit of the collection.

## WEST supported by Aix-Marseille University (AMU)



Several key diagnostics for plasma core and plasma wall interaction studies will be developed jointly with the AMU University and the IRFM.

In the frame of the A\*MIDEX foundation of AMU, two projects focused on WEST have been selected in the "Emergence and innovation" call for proposals. The AMU laboratories involved in these projects (CPPM, Fresnel, IUSTI, LAM, PIIM) will receive a specific funding to provide together with the IRFM innovative measurement systems for WEST.

The supported diagnostics are:

- A plasma facing component survey system based on Infra-red thermography, Bragg optic fibers, thermocouples, calorimetry sensors and erosion markers,
- An X-ray imaging crystal spectroscopy system providing high accuracy and spatially resolved plasma profile measurements for transport and turbulence studies,
- An active spectroscopy system based on thermal Helium beam emission spectroscopy for plasma edge measurements.

A\*MIDEX activities aim at promoting research efforts through the funding of scientific projects, teaching and training, hosting of high level scientific collaborators, as well as the creation of value from research. It is targeted on 5 main headlines: energy, environment, health and biology, sciences and technologies, social sciences and humanities.

## WEST Assessment by EUROfusion

Following a request by the General Assembly of EUROfusion at the beginning of 2014, an international panel was formed with the aim of assessing the future role of WEST as a new facility of the H2020 European Fusion Programme.



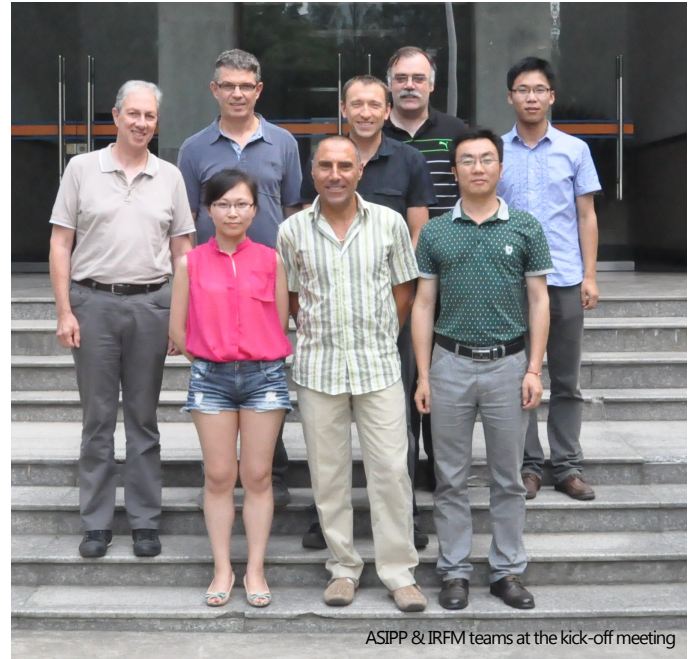
The panel, composed of international scientific experts, including key European experts in the problematic of heat exhaust in fusion devices, was chaired by Pr Boris Sharkov, Scientific Director and Chairman of the management board of the FAIR project in Darmstadt.

The panel gathered at IRFM on June 10<sup>th</sup> for a full day of hearings, and gave its conclusions to the EUROfusion General Assembly Chairperson in July. It recommends EUROfusion to introduce WEST as an important facility focused on the Plasma Facing Component R&D studies in Europe. The EUROfusion Program Management Unit is now in charge of proposing the detailed implementation within the frame of the EUROfusion work packages.

## Manufacturing launched for the three ICRH antennas

On June 4-6, 2014, the kick-off meeting for the manufacturing of WEST ICRH antennas took place in Hefei at ASIPP premises (China).

The IRFM and the Chinese project teams exchange weekly by teleconferencing to manage the ion cyclotron frequency antennas procurement. The kick-off meeting was the occasion for a face to face exchange of knowledge and experiences in mechanical and high-vacuum technologies applied to such complex components. The visit in Hefei of the Chinese workshops and test facilities was also an important moment of these three days. Most of the design was validated and the first material procurement could then be launched after the meeting.



The antenna components will be manufactured in China in the framework of the associated laboratory created by ASIPP and CEA in June 2013. The antennas parts will be assembled at Cadarache and joint operation of the antennas is planned in 2016.

## WEST at SOFT 2014 in San Sebastian, Spain



An invited paper on the "Current status of the WEST Project" (I4.2) and 21 posters on different topics:

### Plasma Heating and Current Drive

- The mechanical structure of the WEST Ion Cyclotron Resonant Heating launchers (P1.024)
- Radio-Frequency electrical design of the WEST long pulse and load resilient ICRH launchers (P1.026)
- Evolution of the Tore Supra Lower Hybrid Current Drive System for WEST (P1.027)
- Validation on test bed of the Tore Supra electron cyclotron launcher upgrade (P1.028)

### Plasma Engineering and Control

- From the conceptual design to the first mock-up of the new WEST plasma control system (P1.035)

### Diagnostics, Data Acquisition and Remote Participation

- RAMI approach as guidance for the design of the WEST machine protection system using IR thermography measurements (P1.050)
- Enhanced Integrators for WEST Magnetic Diagnostics (P1.051)
- Design of soft-X-ray tomographic system in WEST using GEM detectors (P1.052)
- The new Calorimetry diagnostic of WEST and its applications (P1.054)
- Mechanical design and thermo-hydraulic simulation of the infrared thermography diagnostic of the WEST tokamak (P1.055)

### Plasma Facing Components

- The WEST project: Qualification programme for the ITER divertor tungsten plasma facing component technology (P1.094)
- Design and Manufacturing of WEST Baffle (P1.095)
- Heat flux depositions on the WEST divertor and first wall components (P1.096)
- Plasma Facing Components integration studies for the WEST divertor (P1.098)
- Tungsten coating developments on large size and complex geometries CuCrZr elements for the WEST project (P1.099)
- Status of the WEST actively cooled upper divertor (P1.100)

### Vessel/In-Vessel Engineering and Remote Handling

- Application of virtual reality tools for assembly of WEST components: comparison between simulations and physical mockups (P1.111)
- Major upgrade of the Articulated Inspection Arm control system to fulfill daily operation requirements (P1.112)
- Metrology for WEST components design integration optimization (P1.113)
- Manufacturing monitoring and mock-ups validation of the WEST divertor structure and coils (P1.114)
- Design of WEST divertor coils (P1.115)