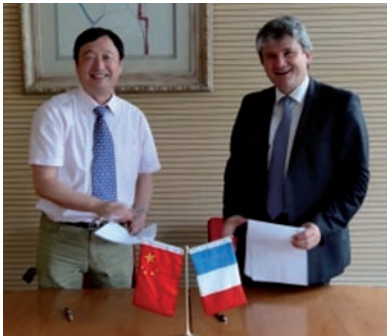


ITER's partners join the WEST project

This summer many cooperation agreements were signed between the CEA and Fusion Institutes around the world. With the Chinese Institutes, SWIP and ASIPP, two new associated laboratories were created. "Sciences and Technology Aspects of Burning Plasmas" (in particular high heat flux component technological developments) and "The Physics of Long Pulse Discharges and Joint Research with the EAST and WEST Tokamaks" are the main areas of research in which these two associated laboratories will be involved. One week later, a collaboration agreement with the

Institute for Plasma Research at Gujarat, India, was signed jointly for the IRFM-IPR development of The Plasma Control System for the WEST and SST-1 Tokamaks. In Europe, the Institute of Plasma Physics and Laser Micro-fusion (IPPLM), a Polish research institute, joined the project in the field of plasma physics and diagnostic design and development. Last but not least, a letter of intent was signed with the DOE (US Department of Energy) for further collaboration between the CEA and the US within the WEST Project.



Beijing, July 2013
J. Li (ASIPP), G. Fioni (CEA).



Ahmedabad, July 2013
D. Bora (IPR), G. Fioni (CEA).

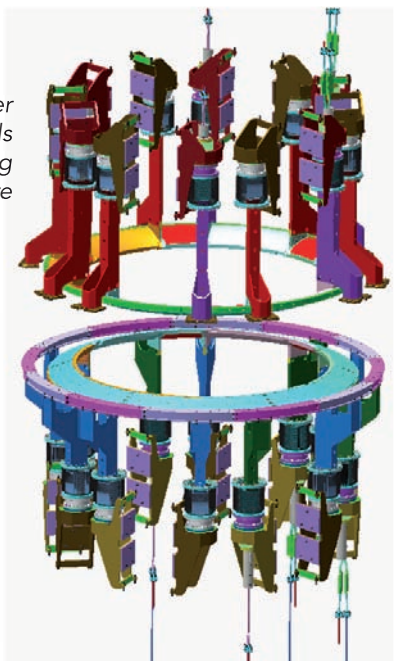
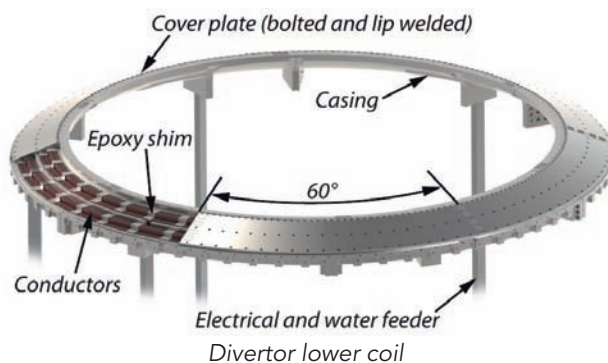


Washington DC, Sept. 2013
J-W. Van Dam (US DOE), G. Fioni (CEA).

Signature of the WEST divertor coils and structure contract

On June 18th 2013, the CEA awarded a procurement contract to the temporary company grouping of CNIM (representative) and AVANTIS for the manufacturing of the WEST divertor structure and coils. The CNIM Group (an acronym that stands for "The Industrial Constructions of the Mediterranean") designs and produces turnkey industrial solutions with high technological content; it is particularly well known for its supervision of the production of the "radial plate" for the ITER toroidal field coils. The AVANTIS group is an engineering company, involved in forfeiting commitment activities and technical assistance in the fields of Aeronautics, Space Exploration, Energy Development, Nuclear Energy, the Defense and Automotive Industries.

The contract is divided into two distinct batches: the winding pack and casing of the upper and lower coils and the supporting structures. The manufacturing will last 18 months with the delivery of the lower coil planned for early September 2014 and the final delivery in early December 2014.



Divertor upper and lower coils and supporting structure

First High Heat Flux Testing on WEST PFCs

The main Plasma Facing Components (PFCs) of the WEST Project will be fully metallic and actively cooled, using an ITER-like tungsten (W) monoblock technology for the lower divertor and metallic cover with W or B (by deposited coating) for the others. These high-performance PFCs will have to sustain heat fluxes ranging from several MW/m² up to 20MW/m² in steady-state conditions. To guarantee their performances in large scale production, the development of reliable methods based on non-destructive testing and the support of powerful high heat flux (HHF) tests are required.

The IRFM has acquired extensive experience in the qualification and the reception of actively-cooled high heat flux components for the Tore Supra limiter and the Wendelstein 7-X divertor, developing an integrated method based on non-destructive and HHF testing. It has provided the opportunity to build partnerships with laboratories worldwide using HHF test facilities. Within the framework of the WEST project, these facilities were considered for testing WEST PFCs. Partnerships in Europe with IPP-Garching (GLADIS ion beam facility), FZJ (JUDITH electron beam facility), DIFFER- (MAGNUM-PSI plasma facility) were consolidated and a new collaboration with SWIP-China (EMS electron beam) was initiated.

The first high heat flux tests have started:

- Qualification tests of the thin W-coating process developed by the French company, DEPHIS on GLADIS.
- Assessment of the EMS-60 facility (Electron beam Material testing Scenario 60 kW) before launching a HHF testing campaign to qualify the thick W-coating process developed by the Chinese company, XTC.



SWIP and IRFM teams: visit of EMS-60 Facility at Chengdu (China), July 2013

The French Research Federation on Magnetic Fusion gathers for WEST



The French Research Federation on Magnetic Fusion (FR-FCM) coordinates the efforts of the French laboratories involved in fusion, including national research institutes (CEA, CNRS, INRIA), universities and engineering schools (Aix-Marseille University, Nice Sophia-Antipolis University, University of Lorraine,

Ecole Polytechnique, etc.). The FR-FCM has been very active in supporting the WEST Project from the start, providing expertise in key areas and participating in the project development.

On May 30, more than 30 experts from the FR-FCM came to Cadarache for a full day of discussion about WEST. The meeting focused on the WEST research plan, establishing the major physics and technology issues to be explored during the operation phase, from 2016 onwards. An exchange of views followed with more than a dozen contributions from the participating laboratories, listing proposals for participation in WEST. Proposals cover a large range of activities, from diagnostic development to post mortem material analysis or plasma simulation, as well as discharge real time control.

A partnership with industry for WEST metrology

The complex structure of the divertor will have to be installed in the limited area of Tore Supra. Therefore, industrial methods of metrology have been used recently to measure the vacuum vessel and the magnetic reference accurately and they will be used for the assembly and positioning of the WEST components.

For this purpose, the IRFM partners are working with two industrial companies: Hexagon Metrology, the world's largest supplier of metrology equipment and software, and the SETIS company, based at Grenoble, well known as experts in the measurement of large mechanical assemblies (LMJ, ALMA, Airbus and many others).

Metrology operation in the vacuum vessel



Sampling points from measurements

