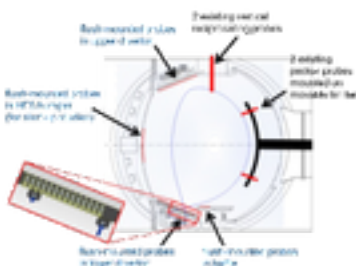


New Langmuir probes to be installed on the WEST divertor targets

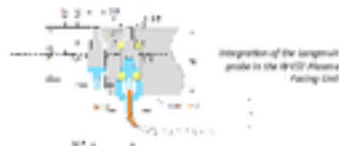
After many years of close partnership with the Institute of Plasma Physics (IPP) of Prague on a great variety of scientific topics, the Czech scientists join the WEST project and will provide arrays of Langmuir probes to be installed in the WEST divertor targets. The Langmuir probe concept was developed by CEA/IRFM and IPP-Prague where another tokamak, COMPASS, is presently in operation.

Langmuir probes are essential to the WEST project. In fusion devices, hot plasma is in direct contact with solid targets designed to withstand intense power flux similar to that which encounters a spacecraft upon reentry into Earth's atmosphere. Erosion of the target by impacting energetic particles can damage it and lead to contamination of the confined plasma. So it is important to be able to measure the plasma flux at the interaction zone at any instant. One way to accomplish this is to embed a small electrostatic probe in the target surface. Such Langmuir probes, as they are called in honor of their inventor, Irving Langmuir, act in much the same way as a common multimeter, providing measurements of plasma density, voltage, and temperature. In order to avoid perturbing the very plasma they are supposed to measure, the probes are flush-mounted into the target with a precision of 0.05 mm.

The design of these measuring tools is challenging because they are subjected to the same harsh environment as the target in which they are embedded. They must be electrically isolated from the target, but at the same time have good thermal contact with it to avoid overheating.



Arrays of Langmuir probes will be installed in the WEST divertor targets. The measurements they make will provide input to plasma-wall interaction studies, but they will also be used for real-time feedback control of the plasma. Using Langmuir probes in closed control loop is a unique application that was developed for the ergodic divertor in Tore Supra. For example, if the probes detect that the plasma at the strike zone is too hot, they can trigger gas injection through a fast valve to cool the plasma down, thus protecting the divertor target.



Contracts for magnetic measurements, vacuum vessel protection panels and lower casks awarded



Example of a vacuum vessel protection panel around an equatorial part

BAC Bobinage Company (61130 Genes) was selected for the manufacturing of the WEST magnetic sensor (420 sensors) while their supporting structures will be manufactured by SEMS Company (02160 Saint Remery). These components will be the first to be installed into the vacuum vessel next autumn.

The vacuum vessel protection panels (40 stainless steel panels) which will then cover the outer part of the vessel will be manufactured by DATE Company (30770 La Motte d'Avellans). The contract for the 12 lower casks that will interface the divertor legs and the vacuum was signed with DMFO Company (02140 Sivry-Francais).