Contribution ID: **633** Type: **not specified**

P2.061 The highest spatial resolution infrared thermography on ITER-like tungsten monoblocs in WEST Tokamak

Tuesday, 18 September 2018 11:00 (2 hours)

A new Infrared diagnostic has been developed by IRFM and installed in the WEST tokamak to measure surface temperature of the actively cooled W-monoblocs components as foreseen for the ITER Divertor units, with a very high spatial resolution of 100µm.

The goals are to investigate the effects of the shaping of these components on the heat load deposition pattern, the evolution of damages specifically introduced in WEST, the behavior of the leading edges regarding the assembling tolerances between adjacent monoblocs, and finally to help in the specification for the protection of ITER divertor.

In WEST, each Plasma Facing Unit is composed of 35 W-monoblocs of individual surface of 28x12mm. To analyze heat load pattern and phenomena on such tiny surfaces, the leading edges and in the narrow gaps between monoblocs (400-500µm), a 100µm spatial resolution is required. Then, a Very High spatial Resolution (VHR) infrared diagnostic has been specially developed at IRFM.

The conceptual design of the endoscope is inspired by space industry. The endoscope structure is light, compact and "flexible-rigid" to endure transient events such disruptions. The VHR is made of 6 mirrors and 4 lenses to achieve the spatial resolution with 40% of encircled energy. The "home-made" WEST infrared camera is a 640*512 pixels matrix. The field of view is a 64*51mm rectangle, which is remotely moved in a 30x40 cm observable area on the divertor (motion of the 2 first mirrors). The VHR operates at 1.7µm wavelength to take advantage of the dynamic of the signal for the temperature range (300 to 3600°C).

The VHR infrared diagnostic is now operational above the divertor sector made of actively cooled W-monoblocs and graphite inertial components with W coating.
A description of the diagnostic will be presented as well as first surface temperature measurements obtained in WEST.

Presenter: HOURY, Michael (Institute for Research on Fusion by Magnetic Confinement CEA)

Session Classification: P2