STATUS OF THOMSON SCATTERING DIAGNOSTICS FOR ITER DIVERTOR

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Thomson scattering diagnostics of ITER divertor (DTS) has a high priority in connection with a wide range of tasks – just as a physics program, so the problems related to the safety of the reactor and control the position of the plasma column during the disruption. DTS is mainly based on the common approaches that are conventional for diagnostic systems on the large-scale tokamaks, but at the same time, the design requires to solve the numerous problems resulted from the hard measurement conditions, expected in the reactor. They are radiation and heat load on the structural and optical elements, located directly in the divertor, an intensive flux of contaminants towards the optical elements, spatially limited access to the plasma, both for the probing and collecting optical systems, vibration load and possible seismic events. In addition, the resulting modifications in the ITER design often require to correct the already developed systems. Thus, the latest requirement (2014) to resize space reservation for in-vessel DTS became the basis for redesign of optical scheme and constructions that are discussed in this paper. Also the paper presents the current state of the basic diagnostic equipment developments

- A collection and transportation scattered light systems

- Development of systems to maintain the in-vessel optics under operation: mechanical devices to protect the optical surfaces from the plasma exposure, gas-jet systems to remove dust particles and plasma cleaning

- Photo-registration system based on avalanche diodes, low-noise amplifier and a new digitizing approach based on Switched Capacitor Array

- Powerful solid-state laser systems with wavelengths 1064, 1047, 946 nm

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