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DEVELOPMENT OF CASSETTE ASSEMBLY COMPONENTS OF DIVERTOR THOMSON SCATTERING LOCATED ON ITER DIVERTOR CASSETTES *)

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The report presents the state of affairs on the development of components of Divertor Thomson scattering located on divertor cassettes of the ITER tokamak in close proximity to thermonuclear plasma. One of the tasks of Thomson scattering in the divertor plasma of ITER is to provide data about spatial distribution of electron temperature and density required to control plasma parameters [1]. Another functional purpose of the diagnostic is to collect information for analysis of physical processes and development of reliable models and simulation codes. Diagnostic components located on divertor cassettes are the most susceptible to radiation heating, the effects of strong magnetic field, and shock loads due to eddy currents caused by interaction of plasma currents caused by disruptions of a plasma discharge and a strong magnetic fields. Their integrity ultimately determines the operability of not only the diagnostic systems, but also the ITER operation. The diagnostic components located on the divertor cassettes 21 and 22 are functionally divided onto

- gas-dynamic protection of laser mirrors from the materials eroded from the first wall during pulsed pressure surges at the boundary of the plasma discharge (Dust baffle and Dust visor) [2],
- shielding of the collection system Black body radiation of the heated divertor plates (Shadow screens) on 21 and 22 divertor cassettes,
- protection of the ITER vacuum volume wall from powerful laser radiation (Laser beam dump).

The main materials of the components are monocrystalline molybdenum, TZM alloys (molybdenum, zirconium, titanium), Inconel718, 316 L(N)-IG steel, PAPYEX graphite sheets. PAPYEX graphite sheets provide thermal contact between the diagnostic components and the body of the cooled divertor cassette.

The analysis of applied electromagnetic and thermomechanical loads is carried out. Numerical simulation of stresses in structural elements using the ANSYS software package has shown that the maximum stress values do not exceed the permissible values for selected materials in accordance with accepted design rules, which ensures long-term operation of the developed diagnostic components located on divertor cassettes 21 and 22.

References

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