STATUS of the development of the ITER VERtiCAL NEUTRON CAMERA Diagnostic

Nemtsev G.E., Amosov V.N., Golachev V.M., Meshchaninov S.A., Rodionov N.B., Rodionov R.N.

Institution “Project Center ITER”, Moscow, Russia, [g.nemtsev@iterrf.ru](mailto:g.nemtsev@iterrf.ru)

Currently, within the framework ITER obligations, the Russian Domestic Agency is developing a Vertical Neutron Camera (VNC) diagnostic system. This system is based on multichannel neutron collimators and it is designed to measure the neutron source profile and the fusion density profile in real time. Diagnostics consists of two subsystems: the upper VNC located in the port-plug 18 of the upper port and the lower VNC, built into the diagnostic rack 14 of the lower port. During diagnostic development it is necessary to solve a number of engineering, scientific and technical problems. VNC should be operated in a combination of high neutron, thermal, electromagnetic, hydraulic, vibration and other loads. The main components of the system must be maintained by the ITER remote control system. Diagnostics should work in wide range of neutron flux and determine the parameters of the plasma with a low error.

This paper presents the current status of the VNC, describes the design of diagnostics and the process of its integration into the tokamak vacuum chamber, presents the results of the development of detectors and data collection systems, shows the calculations of detector signals. As neutron detectors in VNC we use 238U fission chambers and semiconductor detectors based on synthetic CVD diamond. The results of this work will be used in the review of diagnostic in the international organization of ITER.

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