DEVELOPMENT OF KEY ELEMENTS OF NPA SYSTEM QUALIFIED FOR ITER

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Neutral particle analysis (NPA) is considered to be the main diagnostics to provide the information about the hydrogen isotope plasma composition in ITER [1, 2]. At present the key elements of NPA system are intensively being developed at A.F. Ioffe Physical-Technical Institute (St. Petersburg, Russia). In the report we present recent essential results of the development.

At first the project of the neutron shielding of diagnostic components is discussed. Results of computer modeling of the advanced neutron shield design are analyzed from the point of view of decreasing the radiation dose around the NPA system. Then influence of ITER stray magnetic fields on the diagnostics performance is also studied. Results of the magnetic shield design optimization and of the particle trajectory analysis are presented.

New mock-up of +100 kV accelerator unit with integrated prototype of the foils exchange mechanism is described in details. Test results of the unit and achieved parameters are discussed. Besides new mock-up of the foils control system based on use of the thermoionic source of sodium ions is presented. Characteristics of the source beam obtained during test experiments and perspectives of this development are analyzed.

Presented data testify a significant progress in NPA system development for ITER and show the main problem-solving approaches used to provide the necessary parameters of the developed diagnostic equipment.

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References.

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