6-CHANNEL fission CHAMBER SIGNALS SIMULATOR For DNFM ITER DIAGNOSTIC [[1]](#footnote-1)\*)

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Diagnostics "Divertor Neutron Flux Monitor" (DNFM) is a part of the ITER neutron diagnostics complex and intended to measure the total neutron flux and fusion power of the tokamak reactor. The diagnostics consists of three identical subsystems. In each subsystem of the DNFM neutron flux is measured using a detector module, which consists of 2 fission chambers (FC) in three-sectional design.

Signals of each FC are processed by a separate measurement channel. In all measuring channels three processing methods – pulse, Campbelling (fluctuation) and current - are implemented. In one subsystem calculates 18 values of count rates and value of neutron flux. Such a complex measurement system is necessary to meet the ITER requirements for measurement range, errors, and reliability.

The current results of the development of a 6-channel signal simulator of DNFM detector module are shown in the report. The simulator is a hardware-software complex, which allows generating signals similar to FC signals. The simulator is intended for comprehensive adjustment of the DNFM equipment and acceptance tests at the ITER site. The feature of the simulator is the possibility of synchronous or separate channels operation.

The simulator is implemented as three identical devices based on a personal computer (PC) in a special configuration. Each PC contains a two-channel arbitrary waveform generator (AWG) board.

The simulator is controlled by special software that provides:

* configuration of AWG boards;
* calculation of pulse sequence in accordance with the specified test dynamics of the total neutron flux and fusion power;
* generation of test files with signals simulating the dynamics of the total neutron yield;
* generation (single or cyclic) of signals at the simulator outputs;

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References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/JR-Dzhurik.docx) [↑](#footnote-ref-1)