Modelling of the CVD-Daimond detector response function [[1]](#footnote-1)\*)

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Current work describes modelling of the diamond detector response function under neutrons of various energies. Detectors based on chemical vapor deposition (CVD) diamond crystals are widely used for fast neutron measurements on various modern tokamaks. This type of detectors is planned to also be a part of the neutron diagnostics on ITER – Vertical- and Radial Neutron Camera. Thus, the task of the accurate calculation of the diamond detector response function gains significant relevance.

During an experimental campaign designed to validate the modelling results, two sets of experiments were conducted. Several detector responses were acquired from a detector assembly subjected to a 2.5 MeV DD-neutron irradiation on the ING-07D neutron generator. The separate measurements were made on the NG-24M neutron generator whilst irradiating the detector with the ~14 MeV DT-neutrons. Additionally, we conducted the energy axis calibration measurements using the standard 226Ra α-source. In this work we discuss the results of the correlation analysis between the modelled and the experimentally derived detector responses. Modelled responses were generated using the GEANT4 [1] software.

Derived response function allows for assessment of the detector energy resolution, count-rate analysis for different operating regimes. This function also serves as an input to the incident spectra deconvolution procedure. Ultimately, this result provides an opportunity to assess in detail the validity range for the reconstructed parameters of the plasma source.

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Литература

1. J. Allison et al., “Recent developments in GEANT4,” Nucl. Instruments Methods Phys. Res. Sect. A Accel. Spectrometers, Detect. Assoc. Equip., vol. 835, pp. 186–225, Nov. 2016.

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