Application of non-organic scintillators to dd-Neutron flux monitoring [[1]](#footnote-1)\*)

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Current work discusses the use of non-organic scintillator crystals for DD-neutron flux monitoring. This type of crystals can potentially be utilized on modern magnetic confinement fusion research facilities. We provide an application overview of the crystals that allow for n–γ pulse shape discrimination.

For modelling of the chlorine-based scintillator detector response functions we utilize the GEANT4 [1] software. We explore the correlation between the modelled responses and experimental data for various incident particle energies.

During preparation of the LaCl3(Ce) crystal for experiments with AmBe neutron source and ING-07D neutron generator we have conducted the following procedures: instrumentation parameter setup, energy axis calibration. We discuss in detail the neutron measurements that followed.

Calculated response functions demonstrate good correlation with the data acquired during experimental measurements. These functions allow assessment of the spectrometric setup count-rate during various fusion device operating conditions. This, in turn, allows for verifying the limitations of the plasma parameter reconstruction.

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References

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/IT-Kormilitsyn.docx) [↑](#footnote-ref-1)