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The compact D-D neutron generator with controllable flux for low-background detector calibration purposes

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The d+d reaction is very well suited for calibration due to the 2.45 MeV fast neutron reaction channel. Due to this circumstance, the d+d neutron generator is considered as one of the promising tools for calibrating low-background neutrino and dark matter detectors [1]. The current status of the development of a compact neutron generator is presented. The generator includes the elements of the Pierce electron gun, magnetic elements for effective ion generation and the target assembly at a positive potential. Unlike previous versions [2-5], the current version of the neutron generator allows obtaining a stable and controllable low neutron flux (100-1000 particles per second per full solid angle). The current design of a compact neutron generator, a computer model of the electric field and ion flux are presented. The results of the ion current and neutron flux measurement under various conditions are discussed.

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References [1] F. N. Beg et al., Appl. Phys. Lett. 80, 3009 (2002) [2] A.S. Chepurinov et al., 2017 J. Phys.: Conf. Ser. 798 012119 [3] A.S. Chepurinov et al., 2017 J. Phys.: Conf. Ser. 934 012013. [4] A.S. Chepurinov et al., 2018 JINST 13 C02035 [5] A.S. Chepurinov et al., 2019, J. Phys.: Conf. Ser 1390 012103.

Primary author(s) : CHEPURNOV, Alexander (Skobeltsyn Institute of Nuclear Physics, Moscow State University); GROMOV, Maxim (SINP MSU); KIRSANOV, Mikhail (MEPhI); KUBANKIN, Alexander (Belgorod National Research University); OLEINIK, Andrei (Belgorod State University); KLENIN, Artemiy (Belgorod National Research University)

Presenter(s) : OLEINIK, Andrei (Belgorod State University); KLENIN, Artemiy (Belgorod National Research University)

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