

Nanotubes based neutron generator for calibration of neutrino and dark matter detectors

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Small size neutron generators are promising tool for calibration of neutrino and dark matter detectors instead of the traditional neutron guns and isotope sources. We propose original construction of simple and compact neutron generator consists of carbon nanotubes (CNT) array with diameter 1 mm as ionizer together with deuterated target and vacuum-tight body filled with residual deuterium. Experimental results show the possibility to produce neutrons intensity in the range of 10^2 - 10^3 neutrons per second with the accelerating voltage of 10-40 kV and residual gas pressure of 1-5 mtorr. The multiwall CNT arrays with 1.5 μm diameter, 2 μm height and 3 μm distance, inscribed in a circle with a diameter of 1 mm, have been synthesized by plasma-enhanced chemical vapor deposition on the n-type high-conductive silicon substrate.

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