

CALIBRATION OF THE NEUTRON MONITOR

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The helium-3 proportional counter employed as a neutron monitor, has components of single helium-3 counter and moderator (polyethylene, paraffin). The helium-3 in this detector is responsible for capturing thermal neutrons that produce tritium and protons in the working gas. GEANT4 program is necessary to find the detector efficiency due to the helium-3 capture of neutrons, which can then be used for calibration of the detector.

In finding the efficiency we used GEANT4 to model the detector and find the efficiency as a function of neutron energy. GEANT4 is a program that allows input of the system geometry and materials (moderator and helium3), radiation source and geometry. We had a certain number of neutrons of a given energy aimed at the detector alone and coming from a source. We looked at the number of neutrons that captured in counter out of the total number of neutrons, and plotted the results as a function of energy.

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