

Evaluation of the Responses of the NuDet Neutron Detector in the Mini Labyrinth Experiment

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Abstract. The Mini Labyrinth experiment is a simple neutron and gamma shielding experiment developed at STU, inspired by the ALARM-CF-AIR-LAB-001 ICSBEP benchmark. Compared to the original Labyrinth, which was made from concrete blocks and had dimension of several meters, the STU Mini Labyrinth is approximately ten times smaller and consists of NEUTRONSTOP shielding blocks. So far, several versions and modifications of the Mini Labyrinth have been investigated, currently the V2-25-L version is used for code evaluation. This version uses a PuBe neutron source loaded in the entrance of the Mini Labyrinth, a plastic tank filled with light water moderator and the NUDET plastic scintillation neutron detector, which can be placed around the experimental workplace. This detector has a significant role in the experiment since it is a calibration apparatus and provides real time data on the rates of ambient dose equivalents of neutron radiation. On the other hand, as it is a certified commercial product, the response function of this detector is unknown, which makes a significant challenge of verifying the measured data with computer codes. This paper presents a result of a series of measurements with the NUDET detector performed at STU and discusses the options, how to verify the experimental results by the SCALE6 system in the most effective way.