

Monitoring of the radiation doses around the mini labyrinth experimental workspace at STU

pondělí 8. listopadu 2021 11:15 (15 minut)

Since World War II there has been a significant development of methods and approaches used in the calculation of radiation shielding. Over time, modelling and simulation of relevant effects shifted from an analytical modelling to methods based on the so-called primary principles and their stochastic nature. Even nowadays it is necessary to know the accuracy of available computation codes, used nuclear data and it is desirable to evaluate the influence of the user on the final calculated parameter. One of the most effective ways of gaining user experience and minimizing user effects on the results of calculation is international collaboration comprising the designing and constructing of relevant benchmark experiments, following simulation with state-of-the—art calculation tools, comparison of work group results and subsequent identification of the source of observed deviations from the experiment. Currently a new experimental workplace, the so called "Mini Labyrinth" is being developed at STU. It is a simple neutron and gamma shielding benchmark, inspired by the ALARM-CF-AIR-LAB-001 ICSBEP experiment. The latest V1 experimental setup consists of a PuBe neutron source, several NEUTRONSTOP C5 shielding blocks (polyethylene with 5 % boron), H₂O filled PLA tank, plastic source holder, and detectors placed inside the Mini Labyrinth and around the experimental workplace. This paper is indeed focused on the monitoring of the radiation doses around the workplace using the NUVIATEC NUDET detector and the Thermo Scientific RadEye personal dose meter, as well as on the comparison of the measured quantities with ones simulated by MONACO (as a part of SCALE 6.2.4 system) and MCNP 6. The influence of different cross-section libraries and propagation of cross-section uncertainties is studied through this shielding analysis. The achieved results are included and finally, some discussions on further needed development are also included.

Přihlásit do soutěže

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Zařazení sekce: Dozimetrie zevního a vnitřního ozáření

Tematická klasifikace: Dozimetrie zevního a vnitřního ozáření