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#01-195 Measuring the delayed neutrons multiplicity and kinetic parameters for the thermal induced fission of ^{235}U, ^{233}U and ^{239}Pu

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Depending on the used library, nuclear data regarding the emission of delayed neutrons present significant discrepancies. Therefore, in the framework of the NEEDS/NACRE collaboration, the ALDEN (Average Lifetime of DElayed Neutrons) program was launched in 2018 by CEA (DES and DRF), CNRS (LPSC, CENBG, LPC Caen), ENSICAEN and Caen University. This program aims at measuring the (α_i,λ_i) parameters describing the emission kinetics of the delayed neutrons as well as their average multiplicity ν_d.
To this end, a new experimental device, conceived using TRIPOLI4® Monte-Carlo simulation, was designed to measure the thermal induced fission of actinides on the PF1b cold neutron beam-line of the Institut Laue-Langevin (ILL, Grenoble, France). This device consists in a cylindrical matrix of polyethylene, shielded using a thin B4C layer, and at the centre of which a miniature fission chamber containing the actinide to study is placed. This chamber is irradiated for a period of time t_{irr}, then the beam is shut using a motion-controlled thermal neutrons screen. Delayed neutrons, measured over a period of time t, are thermalized in the polyethylene matrix and detected using 16 ^{3}He proportional counters. They are positioned into three rings to ensure a detection efficiency as constant as possible between 0.1 and 1 MeV (energy range of the delayed neutrons). Irradiation cycles (t_{irr}+t) are repeated until a good counting statistics is obtained. All events are recorded using the NOMAD digital acquisition system developed by the ILL and the resulting curve is fitted using the CEA-developed CONRAD regression software.
After detailing the experimental setup, this paper presents the adaptations that were made to it in order to allow studying ^{239}Pu. Results obtained during the experimental campaign of June 2019, dedicated to the thermal induced fission of ^{235}U, and first results of the experimental campaign of the beginning of 2021, dedicated to ^{239}Pu and ^{233}U, are presented.

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