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Monte Carlo simulation approach for generating NaI Detector Response Functions (DRFs) to account for delayed gammas due to detector activation

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During neutron irradiation in Prompt Gamma Neutron Activation Analysis (PGNAA), absorption of thermal neutrons by the detector is inevitable. Therefore, the final gamma spectrum will be a mixture of natural background, delayed and prompt gamma-rays originated from different setup parts including moderator, sample and detector itself. A Delayed-Gamma-Monte-Carlo Code (DGMC) was written to determine delayed gamma neutron activation spectrum arising from an active detector. Spectral response of 3"×3" Na(Tl) crystal to thermal neutron beam was also simulated while the neutron beam was ''on".

Primary authors: Dr PANJEH, Hamed (FUM Radiation Detection and Measurement Lab, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran); ABBASI, Motahhareh (Department of Physics, Faculty of Science, Guilan University, Rasht, Iran)

Co-authors: Dr KETTLER, John (Institute of Nuclear Fuel Cycle, RWTH Aachen University, Aachen, Germany); Prof. IZADI, Reza (FUM Radiation Detection and Measurement Lab, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran)

Presenter: ABBASI, Motahhareh (Department of Physics, Faculty of Science, Guilan University, Rasht, Iran)

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