

Contribution of the Scattered Radiation on the Neutron Beam Fluence in the Neutron Calibration Laboratory at IPEN

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In the past few years, Brazil and several other countries in Latin America have experimented a great demand for the calibration of neutron detectors, mainly due to the increase in oil prospection and extraction procedures. The only laboratory for dosimetry of neutron detectors in Brazil is located at the Institute for Radioprotection and Dosimetry (IRD/CNEN), Rio de Janeiro. This laboratory is the national standard calibration laboratory in Brazil. With the increase in the demand for the calibration of neutron detectors, the need for more calibration services became evident. In this context, the Calibration Laboratory of IPEN/CNEN, São Paulo, which already offers calibration services of radiation detectors with standard X, gamma, beta and alpha beams, recently projected a new calibration laboratory for neutron detectors. One of the main problems in this kind of calibration laboratory is related to the knowledge of scattered radiation. In order to evaluate it, simulations were performed without the presence of the structural elements and with the complete room. Fourteen measurement points were evaluated in two directions at various distances. As part of the characterization process of the radiation fields of the new Neutron Calibration Laboratory (LCN), this work intends to evaluate the influence of the radiation dispersed by the structural components of the room: walls, doors, ceiling and floor, in different calibration positions, on the detector response. Therefore, the neutron radiation attenuation and the scattering parameters were determined at different source-detector distances, through computational simulation, using the MCNP5 Monte Carlo code.

Keywords: Neutron radiation, Scattered radiation, Neutron calibration, Neutron detector

Conference topics: New radiation sources, techniques & detectors