

Instruments for the characterization of high energy neutron beams

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Despite the increasing importance of simulation tools for the development of detectors and dosimeters for high-energy neutron radiation, measurements in neutron reference beams are still indispensable for the verification of calculated detector responses. Beams with a continuous energy distribution can be used if the instrument under test allows the selection of the neutron energy using the time-of-flight technique, but quasi-monoenergetic beams are required for dosimeters integrated over the neutron energy distribution. Thus, the characterization of these reference beams must basically cover the energy range from thermal neutrons to the maximum energy, which can be several hundred MeV. In most cases, this task can only be accomplished by combining measurements with several different reference detectors traceable to the primary standards of the neutron fluence. The talk will give an overview of the most important types of reference detectors for the fluence of high-energy neutrons. In addition, detectors for measuring the spatial neutron fluence distribution, i.e. the beam profile, and monitor detectors for correlating measurements at different fluence rate levels will be discussed.

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