
NUCLEAR DECAY DATA: ON-GOING STUDIES TO ADDRESS AND IMPROVE RADIONUCLIDE DECAY CHARACTERISTICS

A. L. Nichols

Department of Nuclear Sciences and Applications, Nuclear Data Section, International Atomic Energy Agency, Wagramerstrasse 5, PO Box 100, A-1400 Vienna, Austria

Decay data activities throughout the nuclear-data community are somewhat diverse and sparse compared with the amount of effort focused historically on improving our knowledge of the important cross sections identified with various fission and fusion processes. However, there are decay parameters for a significant number of radionuclides that require more accurate and reliable characterization in order to achieve the desired credibility when addressing safety criteria and cost-effective demands for: decay-heat assessments; shielding requirements for irradiated nuclear fuel; both the intermediate- and long-term treatment and storage of radioactive waste; activation of structural materials and impurities within fusion devices; and non-energy related applications, such as diagnostic studies and therapeutic treatments in nuclear medicine, and standards for various nuclear-based analytical techniques.

Known decay data studies are described, ranging from various measurement programmes to the maintenance of evaluated decay-data libraries. Gross beta-decay measurements are essential to address the decay-data requirements for short-lived fission products, well-defined half-lives are required in assessments of the storage of long-lived radionuclides in waste depositories, and improved decay data continue to be demanded in safeguards, to improve detector-calibration standards, and for medical and analytical applications. Such needs require the measurement of good quality decay data, along with the multinational formulation and undertaking of decay-scheme evaluations through agreed procedures.