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Ionization dosimetry for radiological protection management

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The paper presents the law of radioactive decay to define the activity intake; the cumulated activity and the number of transformations in the S source organ; the law of photon attenuation and absorption for defining the interaction coefficients for photons; the "law" of stopping powers by ionizing and exciting the atoms, to define the interaction coefficients of charged particles and the "law" of the electromagnetic radiation of the black body. Basic concepts and principles for internal and external exposure: dosimetry quantities, calibration factors and the quantities of radiation protection: organ absorbed dose, equivalent dose and effective dose; for the evaluation of protection quantities at external exposure: the dose equivalent and the operational quantities to estimate effective dose; for internal exposure assessment: the mean absorbed dose estimation (MIRD) in the T target organ, based on the physical factor S0, tabulated, and the internal dose estimation (ICRP), based on specific effective energy, SEE, equivalent dose in T per transformation in S. The committed dose equivalent, HT(τ), the committed effective dose, E(τ), where τ is the period of internal irradiation, 50 years for adults and 70 years for children. The total annual effective dose for occupational exposure is, E(W) = HP(10) + E(50), where HP(10) is the personal dose equivalent. The annual effective dose to the public is the sum of the effective dose obtained in one year from external exposure with the committed effective dose due to the radionuclides incorporated in the same year.

Biography

Scarlat Florea. Holder: Physicist engineer diploma, PhD diploma, University professor title and Head of the Physics department at UVT. He is Member of the New Yok Academy of Sciences, and Founding Member of the Balkan Union of Oncology (BUON) Athens. He introduced high energies in the treatment of cancer in Romania, using the 30 MeV IFA Betatron and built in Romania the first 40 MeV IFA medical betatron (with electron beams of 10, 15, 20, and 25 MeV and the 35 MeV photon beam, EPAC96 London). He was Scientific Director of IFIN-Bucharest, Director of GEC-RON, Leicester, England. Currently, he is a Consultant Manager at the STARDOOR laboratory founded by him within the National Institute for Laser, Plasma and Radiation Physics.

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