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DOSIMETRY OF SMALL PHOTON RADIATION FIELDS: COMPARISON OF THE GERMAN DIN-6809 (2016) AND THE IAEA TRS- 483 (2017) PROTOCOLS

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Modern radiation techniques such as stereotactic radiosurgery and intensity modulated radiation therapy (IMRT) use small radiation fields (field sizes <2x2 cm2), which deviate significantly from the dosimetric reference field size 10x10 cm2. Small photon field dosimetry requires further development of today's codes of practice, because of the changing physical conditions. The resulting changes in physical and dosimetric conditions go beyond the measuring methods defined in the popular standard protocols like IAEA TRS-398, German DIN 6800-2, and AAMP TG-51. For this reason, the German standard DIN 6809-8 (2016) and the international IAEA TRS-483 (2017) protocols have recently been developed. They define the measuring methods and physical parameters of dosimetry of small photon fields. The IAEA TRS-483 protocol is an extension of the Codes of Practice TRS-378 based on the basic work of Alfonso et al. Similarly the standard DIN 6809-8 is an extension of the DIN 6800-2 for small field. The content of the DIN 6809-8 standard is, among others, the introduction of a new reference field size to ensure an adaptation to the conditions of the small photon fields. It is defined as the small calibration field. Furthermore, correction values are recommended which correct the influence of the detectors on the measured value when measured field sizes are smaller than the small calibration field. In this norm, the detector-dependent correction factors are based on the formalism of Alfonso et al. The DIN 6809-8 is a suitable recommendation for small field dosimetry and ensures the alignment of the Codes of practice. The principles of determination of the absorbed dose in water according to both protocols and a comparison of results for different high energy photon beams are explained in this paper.

Biography

Prof. Dr. G. A. Zakaria studied physics at the University of Halle-Wittenberg in 1978, and post-graduated at the University of Goettingen and received his Ph. D in medical physics at Heidelberg University, Germany.

Prof. Zakaria is currently the chairman of the Department of Medical Radiation Physics at Gummersbach Teaching Hospital of the University of Cologne and professor of Biomedical Engineering at the University of Applied Sciences in Koethen. Furthermore he has been invited as Guest/honorary/adjunct professor in many institutes or universities in Germany, Italy, China and Bangladesh. Since January 2018, Dr. Zakaria is nominated as the Accreditation Committee-2 Chair (Radio-Oncology Physics) of the International Medical Physics Certification Board (IMPCB).

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