

Radiation therapy dosimetry in Switzerland

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Introduction

The current status of calibration and verification of radiation therapy dosimeters for high energy photons, electrons and soft x-rays in Switzerland is reviewed. Experimental results of absolute dosimetry using the METAS water calorimeter at the scanned proton beam at PSI are presented and the procedure for calibrating the TLD dosimeters for the planned SGSMP electron comparison in 2010 will be described.

Methods and Results

In Switzerland, the reference ionization chambers used as dosimeters for measuring absorbed dose to water in high energy photon, electron and x-ray radiation therapy are calibrated and verified on a four year basis at METAS and IRA, following the IAEA TRS 398 protocol [1]. The primary standard for absorbed dose to water for photons is water calorimetry [2] and for absorbed dose to water for electrons it is Fricke dosimetry. The dosimeters are calibrated at the respective beam radiation quality of high energy photons and electrons using the METAS microcyclotron accelerator.

Owing to the fact that the number of proton therapy facilities is increasing, the International Commission on Radiation Units and Measurements (ICRU) has recommended in their Report nr.78 of 2007 that calorimeters should be used as primary standard for proton dosimetry or, alternatively, for verifying the proton calibration coefficients of TRS 398. METAS has collaborated with PSI in order to investigate the feasibility of water calorimetry for dosimetry of scanned proton beams [3]. Within the uncertainties limited by statistics, the measurements confirm the TRS 398 proton calibration coefficients.

The SGSMP dosimeter intercomparison planned for the year 2010 will be a TLD dosimetry comparison of the electron beam dosimetry performed at the Swiss radiation therapy centres. The TLDs provided by the Kantonsspital St.Gallen will be calibrated at METAS using Fricke dosimetry.

References (12 pt, bold)

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