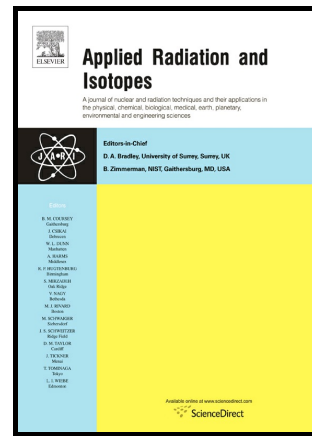


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Determination of correction factors in beta radiation beams using Monte Carlo method

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Abstract

The absorbed dose rate is the main characterization quantity for beta radiation. The extrapolation chamber is considered the primary standard instrument. To determine absorbed dose rates in beta radiation beams, it is necessary to establish several correction factors. In this work, the correction factors for the backscatter due to the collecting electrode and to the guard ring, and the correction factor for Bremsstrahlung in beta secondary standard radiation beams are presented. For this purpose, the Monte Carlo method was applied. The results obtained are considered acceptable, and they agree within the uncertainties. The differences between the backscatter factors determined by the Monte Carlo method and those of the ISO standard were 0.6 %, 0.9% and 2.04 % for ⁹⁰Sr/⁹⁰Y, ⁸⁵Kr and ¹⁴⁷Pm sources respectively. The differences between the Bremsstrahlung factors determined by the Monte Carlo method and those of the ISO were 0.25 %, 0.6% and 1 % for ⁹⁰Sr/⁹⁰Y, ⁸⁵Kr and ¹⁴⁷Pm sources respectively.

Index Terms: Extrapolation chamber, beta radiation, Monte Carlo, backscatter, Bremsstrahlung.

1. Introduction

In beta radiation beams, for a correct measurement of the absorbed dose rate at a point in a phantom, a very small detector is needed. That detector shall

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