

技术及应用

球形石墨空腔电离室壁修正因子的Monte-Carlo模拟和实验测量

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摘要

采用Monte-Carlo模拟和实验测量两种方法对30cm³球形石墨空腔电离室在⁶⁰Co γ射线下的壁修正因子K_{wall}进行研究。实验和模拟计算结果的比较表明, 传统的线性外推法确定的壁修正能基准组的30cm³和50cm³球形石墨空腔电离室在⁶⁰Co γ射线下的相对电离电流和壁修正因子进行了Monte-Carlo模拟计算, 计算的相对电离电流值与NIST发布的实验测量值在0.12%内吻合。

关键词 [石墨电离室](#) [空气比释动能](#) [壁修正因子](#) [Monte-Carlo模拟](#)

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Monte-Carlo Calculation and Measurement of Wall Correction Factor for Spherical Graphite Ionization Chamber

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Abstract The factor K_{wall} to correct for photo attenuation and scatter in the wall of the 30 cm³ and 10 cm³ spherical chambers at National Institute of Metrology for ⁶⁰Co air-kerma measurement is determined by Monte-Carlo calculation and experimental measurement. The calculation using the EGSnrc software system shows that the calculated wall correction factors differ by up to 1.0% from those obtained by linear extrapolations of the measured relative ionization current to zero wall thickness for the measured chambers. The relative ionization current and wall correction factors for the 30 cm³ and 50 cm³ spherical graphite chambers at NIST are calculated and compared with the measured results. The Monte-Carlo code can reproduce the experimental relative ionization current within an accuracy of ±0.12%. This work confirms that for spherical standard chambers the ⁶⁰Co air-kerma reference values should be obtained by a new K_{wall} determined by Monte-Carlo calculations.

Key words [graphite ionization chamber](#) [air-kerma](#) [wall correction factor](#) [Monte-Carlo](#)

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