快报

电子比能和细胞S值的Monte-Carlo计算

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摘要　　电离辐射通过它们产生的次级电子将能量传递给生物介质。在核医学以及BNCT等放射诊断和治疗中，放射性核素在细胞尺度上的分布是不均匀的。为了解电离辐射与生物介质的直接作用，需对电子的细胞微剂量学进行研究。本文运用Monte-Carlo方法的几种不同程序计算电子的细胞S值和单次事件比能分布。S值的计算结果与MIRD委员会以及其它的理论计算结果基本一致，单次事件比能分布的计算结果与PENELOPE的结果符合很好。

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Monte-Carlo Simulation of Cellular S Value and Specific Energy for Electrons

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Abstract Various ionizing radiations transfer their energy to biological media by producing secondary electrons. In the diagnosis and therapy of nuclear medicine and BNCT, the radionuclides distribute heterogeneously at cellular scale. In order to understand the interaction between ionizing radiation and biological medium, the study of cellular microdosimetry for electrons is needed. S value and the single event specific energy distribution are simulated by several codes, which include different Monte-Carlo methods. The result for S value is in agreement basically with the result of the MIRD committee and other simulations. The single event specific energy distribution in cell is agreed well with the result of the PENELOPE code.

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