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物理

计算电子射程的直接蒙特卡罗方法

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摘要 电子射程的计算通常采用吸收曲线线性外推法，但线性外推法在计算与应用上有一定缺陷。采用相对强度衰减至一定比例的定义法也可用来确定射程。本文首先对定义法的数值模拟方案提出改进，然后研究提出计算电子射程的直接蒙特卡罗模拟方法。直接蒙特卡罗模拟方法不需计算注量，直接以射程为统计量，该方法使用方便，不受电子能量、衰减介质厚度的限制，具有很高的计算精度和计算效率，还可给出射程的区间估计。

关键词 射程 直接蒙特卡罗方法 电子 辐射防护

分类号

Direct Monte-Carlo Method for Calculation of Electron Range

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Abstract The linear extrapolate method that widely used to calculate the range of electron has some shortcomings in the calculation and application. In the reference document, the range was defined as the thickness of shielding media, where relative intensity is 0.01. First, the modification to the numerical method of the reference document was given, and then a new calculation method for electron range was given. The range of electron was counted directly by direct Monte-Carlo method, whereas electron fluence was not concerned. The new method can easily calculate the range of electrons with various energies, without the restriction of thickness of shielding media. The calculation precision and efficiency of new method are very good. It also can provide the confidence interval of range.

Key words range direct Monte-Carlo method electron radio protection

DOI

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