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技术及应用

铀部件质量属性测量中的信噪比初步分析

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摘要 利用蒙特卡罗程序对252Cf快电离室诱发不同质量金属铀部件的中子输运过程进行了模拟，获得屏蔽与直穿两种实验布局条件下252Cf快电离室与探测器之间的中子时间关联符合计数，初步评估测量过程中的信噪比，作为实验前端布局的重要依据。结果表明，两种布局下的信噪比均与铀部件质量成正比，直穿布局下的信噪比较高。

关键词 时间关联符合计数 铀部件属性 信噪比

分类号

Preliminary Analysis on Ratio of Signal to Noise in Mass Measurements of Uranium Components

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Abstract Under two different experimental configurations, one with shield and the other straight incidence without any shield, time correlation coincidence counts of neutron between 252Cf fast ionization chamber and detector for uranium components with different masses, which induced by 252Cf fast ionization chamber, were calculated with Monte-Carlo method. Then the ratios of signal to noise in different simulations were roughly estimated in order to give some very important guidance on choice of experimental configuration. The results show that the ratio of signal to noise is proportion to the mass of uranium component under two experimental configurations. Additionally, the ratio of signal to noise under experimental configuration of straight incidence is greater than that of the other configuration.

Key words time correlation coincidence count properties of uranium component signal to noise ratio

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