

技术及应用

## 用于闪烁薄膜探测器灵敏度标定的中子屏蔽体设计

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收稿日期 修回日期 网络版发布日期:

**摘要** 为标定薄膜厚度大于0.1 mm的闪烁薄膜探测器灵敏度, 采用MCNP程序建模优化设计了适用于在中国原子能科学研究院放射性计量测试部的5SDH-2串列加速器上进行实验的中子屏蔽体。实验表明, 该屏蔽体可将偏离通道的中子注量减弱到通道中子注量的十分之一以下, 将本底信号抑制在较光电倍增管暗电流略低的水平上, 对于薄膜厚度大于0.1 mm的探测器, 可使其信噪比大于1:1。计算表明, 准直孔的散射对探测器测量灵敏度的影响不超过5%。

**关键词** [屏蔽体](#) [准直器](#) [闪烁薄膜探测器](#) [MCNP](#)

分类号

## Design of Neutron Shield Used for Calibrating Sensitivity of Scintillating-Film Neutron Detector

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**Abstract** In order to calibrate the sensitivity of the scintillating-film neutron detector with the scintillator thickness great than 0.1 mm in 5SDH-2 accelerator at the Radiation Metrology Center of China Institute of Atomic Energy, a neutron shield was designed by modeling and optimizing with MCNP program. Experiment results show that this shield can attenuate the neutron fluence out of collimator to one-tenth of that in the collimator, and constrain the background signal to the level of photomultiplier's (PMT) dark current, therefore, it can make signal to noise of the detector great than 1:1 for the detector with thickness of scintillator above 0.1 mm. Calculation results indicate that sensitivity change resulted from collimator scattering is less than 5%.

**Key words** [shield](#) [collimator](#) [scintillating-film](#) [detector](#) [MCNP](#)

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