

技术及应用

射线半影编码孔点扩散函数锐度展宽模拟评估

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摘要 阐述了射线半影编码成像系统点扩散函数锐度展宽与一般系统点扩散函数半高宽的区别与联系, 确立了半影编码成像系统锐度展宽概念, 建立了半影编码孔成像系统蒙特卡罗模型。计算获得了0.662、1.25、2.45、5.0、10.0、14.06 MeV等一系列能量点的 γ 射线与中子在半影编码成像系统点扩散函数, 并按照定义算出 γ 射线与中子各能量系统点扩散函数的锐度展宽; 得到 γ 射线和中子能量与半影编码成像系统锐度展宽函数关系, 分析了半影编码成像系统点扩散函数锐度展宽的原因, 为今后编码孔设计的改进提供理论依据。

关键词 [中子半影成像](#) [编码孔](#) [锐度展宽](#) [点扩散函数](#)

分类号

Evaluation by Simulation to Point Spread Function of Emission Penumbra Imaging Encoding Pinhole

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Abstract The differences and relations between sharpness broadening of penumbral imaging system and full width at half maximum (FWHM) of general system's point spread function (PSF) were illuminated and the concept of sharpness broadening of penumbral imaging system was determined. The penumbral encoding pinhole imaging system Monte-Carlo model was built; the system PSFs of γ ray and neutrons in energy of 0.662, 1.25, 2.45, 5.0, 10.0, 14.06 MeV and so on were calculated respectively. The function of the PSFs sharpness broadenings vs γ ray and neutron energy was obtained and the broadening reasons of the system sharpness were analyzed in detail, the theoretical reference was presented for the future design improvement of encoding pinhole.

Key words [neutron](#) [penumbral](#) [imaging](#) [_ encoding](#) [pinhole](#) [_ sharpness](#) [broadening](#) [_ point](#) [spread](#) [function](#)

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