

技术及应用

声空化核效应实验的中子探测系统

李欣年¹; 范祥祥¹; 黄敏¹; 方晓明¹; 钱梦騷²; 程茜²

1.上海大学 射线应用研究所, 上海201800 2.同济大学 声学研究所, 上海200092

收稿日期 修回日期 网络版发布日期:

摘要 设计建立了用于声空化核效应的中子测量系统, 该系统由ST-451液闪探测器和BF₃正比计数管组成, 各中子谱仪的仪器精度<2.42%, 并导出BF₃正比计数管的中子探测灵敏度计算式。利用高压倍加器氘离子轰击D-Ti靶产生的2.45 MeV中子, 对BF₃计数管进行探测灵敏度标定。利用BF₃正比计数管测量声空化核效应实验的声核中子, 由此估算有效中子发生率为 $7.0 \times 10^4 \sim 8.0 \times 10^5 \text{ s}^{-1}$ 。

关键词 [声空化核效应](#) [声核中子](#) [BF₃正比计数管](#) [中子探测灵敏度](#)

分类号

Neutron Detection System for Nuclear Effect of Acoustic Cavitation

LI Xin-nian¹; FAN Xi ang-xi ang¹; HUANG Mi n¹; FANG Xi ao-mi ng¹; QIAN Meng-lu²; CHENG Qi an²

1. Shanghai Applied Radiation Institute, Shanghai University, Shanghai 201800, China; 2. Institute of Acoustics, Tongji University, Shanghai 200092, China

Abstract The neutron detection system based on ST-451 liquid scintillator detector and BF₃ proportional counters was arranged, the instrument precision of the neutron spectrometers was less than 2.42%, and the system was applied on neutron determination in the nuclear effect of acoustic cavitation (NEAC). And the neutron detection sensitivity formula of BF₃ proportional counter was derived. The detection sensitivities of the BF₃ detectors were calibrated by 2.45 MeV neutrons which were emitted from deuterium titanium target bombarded by deuterium ions of high-voltage accelerator. The sonofusion neutron signals were determined used the BF₃ proportional counters, and the effective neutron emissivity estimations were of about 7.0×10^4 to $8.0 \times 10^5 \text{ s}^{-1}$.

Key words [nuclear effect of acoustic cavitation](#) [sonofusion](#) [neutron](#) [BF₃ proportional counter](#) [sensitivity of neutron detection](#)

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