

反应堆工程

MCNP程序用热中子散射数据制作和检验

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摘要 基于ENDF/B-VII.0评价库, 以前已陆续研制了可供MCNP程序使用的连续截面库, 以及多套多个温度、多组邦达连柯背景截面修正的多群参数库。本文采用NJOY程序以及ENDF/B-VII.0评价库热散射子库, 完成了MCNP程序使用热中子散射数据库 $S(\alpha, \beta)$ 的制作和检验。比较了自制库与MCNP自带基于ENDF/B-VI版热散射数据库(sab2002), 对改进较明显的重要介质“轻水中氢”和“重水中氘”给出了分析说明。通过48个基准装置 k_{eff} 计算结果可看出, MCNP程序自带热中子散射库sab2002与自制库thb70计算的 k_{eff} 整体上偏差不大, k_{eff} 平均偏差约65 pcm。

关键词 [ENDF/B-VII.0](#) [热中子散射](#) [MCNP](#) [积分检验](#)

分类号

Generating and Validation of Thermal Neutron Scattering Library for MCNP

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Abstract A continuous neutron transport library for MCNP and several temperature-dependent multigroup cross section libraries with Bondarenko self-shielded factors based on ENDF/B-VII.0 were generated in former work. In the work the thermal $S(\alpha, \beta)$ tables for MCNP code were converted from the thermal neutron scattering sublibrary of ENDF/B-VII.0 using NJOY program. The available thermal $S(\alpha, \beta)$ library named sab2002 (from ENDF/B-VI) released with MCNP were investigated and compared with the self-produced library thb70, and some significant improvements of important medias, such as H in H_2O and D in D_2O , were presented. Forty-eight critical benchmark models were selected to calculate the k_{eff} using sab2002 and thb70, respectively. The results show that there is a not too much difference (65 pcm averagely) between the two libraries.

Key words [ENDF/B-VII.0](#) [thermal](#) [neutron](#) [scattering](#) [MCNP](#) [integral](#) [validation](#)

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