反应堆工程

启明星1#装置快热分界面的中子能谱实验测量与理论计算

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摘要　加速器驱动的快 热包层耦合次临界装置——启明星1#内的中子能谱对于验证系统设计具有重要意义。采用多箔活化法测量了启明星1#装置内快谱区与热谱区分界面上的中子能谱，利用 SAND Ⅱ 及MIST程序进行解谱。同时，采用MCNP程序，通过完全真实三维模拟加速器中子源、快 热耦合包层及反射层情况，得到理论计算谱，并作为活化法解谱的初始输入谱。将实验测量结果与理论计算结果进行比较，二者一致，从而验证了理论计算的正确性。

关键词　启明星1#；多箔活化法；中子能谱；MCNP程序

分类号

Measurement and Analysis of Neutron Energy Spectrum at FastThermal Neutron Interface in Venus 1#

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Abstract It＇s important to know the neutron energy spectrum at the interface between the fast and thermal neutron regions of the accelerator driven coupled fast/thermal spectrum device―Venus 1#. The neutron energy spectrum was measured by the multi foil irradiation method at the interface between the fast and thermal neutron regions. The neutron spectrum unfolding was done by using SAND Ⅱ and MIST computer code. The calculated spectrum, which was used as preinformation in the adjustment procedure, was obtained though the MCNP code. In this calculation, the neutron source, the coupled fast/thermal neutron material region as well as its surroundings were modeled in three dimension. A comparison between the calculated and measured neutron spectra shows well agreement, which indicates the MCNP model correctly simulates the Venus1#.

Key words Venus 1# multiple foil activation method neutron energy spectrum MCNP code

DOI

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