

物理

一种测量缓发中子有效份额 β_{eff} 的方法

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摘要 本工作通过实验与理论计算相结合, 给出了测定缓发中子有效份额 β_{eff} 的新方法。用实验方法确定反应堆临界状态, 并测量次临界状态时以 β_{eff} 为单位的次临界反应性, 应用理论程序计算临界时的中子有效增殖因数 k_{eff} , 确定 k_{eff} 的计算偏差, 然后理论计算次临界状态下的 k_{eff} , 并用确定 k_{eff} 的计算偏差对次临界状态下计算的 k_{eff} 进行修正, 给出次临界状态的反应性。将实验测量结果与理论计算结果相比较, 从而给出 β_{eff} 。这种方法由于是实验确定的反应堆状态, 因此, 按实验结果计算的 k_{eff} 与理论描述反应堆状态的计算模型关系不大。分析表明, β_{eff} 测量结果的精度高于以往测量方法的精度。

关键词 [缓发中子有效份额 \$\beta_{eff}\$](#) [以 \$\beta_{eff}\$ 为单位的次临界反应性](#) [绝对反应性](#)

分类号

A Measurement Method for Effective Delayed Neutron Fraction

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Abstract A method was presented for measurement of effective delayed neutron fraction β_{eff} by coupling experiment with theoretical calculation. In the experiment the reactor critical status was defined, and the subcritical reactivity under subcritical status, by using β_{eff} as unit, was measured. With theoretical calculations, effective multiplication factor k_{eff} under critical status was calculated, and the deviation of the calculated results was evaluated. Then, k_{eff} under subcritical status was calculated and also revised with the deviation as same to critical status. So the reactivity under subcritical status was evaluated. Comparing the experimental result with the calculated result, β_{eff} was defined. Since the reactor status was defined by experiments, the calculated k_{eff} under the status was little dependent on the theoretical models which described the reactor status. The results show that the accuracy of the measured β_{eff} is higher than previous measurements.

Key words [effective delayed neutron fraction \$\beta_{eff}\$](#) [subcritical reactivity in \$\beta_{eff}\$](#) [absolute reactivity](#)

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