快报

裂变链初期增长过程的统计涨落现象研究

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摘要　　利用超临界系统达到临界后t时刻中子密度n的概率分布$P(n,t)$与系统内的中子源强度的关系，结合从第1个持续裂变链开始到系统的中子密度达到定值的时间分布，得到从系统达到临界开始到系统的中子密度达到定值的时间分布，并与Godiva的功率增长过程和BARS的脉冲提前引发概率的实验结果进行了比较，相互符合较好。该研究结果可用于脉冲堆安全分析、临界安全研究和反应堆启动程序制定等。

关键词　　统计涨落　临界系统　中子增殖　裂变链　临界安全
分类号　TL375.2

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Statistical Fluctuation Phenomenon of Early Growth Fission Chain

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Abstract The early growth of neutron population within a supercritical system of fissile material is of a statistical nature and may depart significantly from the average time dependence neutron population. The probability of a source neutron sponsoring a persistent fission chain was considered for a supercritical system. Then the probability distribution in time of the neutron population reaching a preset level was deduced based on the probability $P(n,t)$ of n neutron at time t. By combing the above two probabilities, the probability that at time t after the system reached critical there were n_0 neutron in the system was derived. The P(t) of Godiva neutron excursion at supercritical, and the pre-burst probability of BARS were calculated by this model, and were found agree with the experiment result.

Key words statistical fluctuation _ critical configuration _ neutron multiplication _ fission chain _ criticality safety

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