

反应堆工程

# 聚变-裂变混合堆外中子源效应

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**摘要** 聚变-裂变混合堆 (FFHR) 作为聚变驱动次临界系统 (FDS), 具有良好的物理性能, 能够实现产能、氚增殖、嬗变核废料等功能。采用COUPLE程序研究了水冷混合堆包层的铀水比和中子倍增剂对中子源效率的影响。结果表明: 包层能谱越硬, 外中子源效率越高; 适当加入中子倍增剂Be可使外中子源效率增加。研究结果对进一步改进聚变-裂变混合堆的概念设计具有一定的指导意义。

**关键词** [聚变-裂变混合堆](#) [次临界装置](#) [中子源效率](#) [能量放大](#) [氚增殖](#)

分类号

## Efficiency of Neutron Source in Fusion-Fission Hybrid Reactor

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**Abstract** As a fusion driven subcritical system (FDS), a fusion-fission hybrid reactor (FFHR) is of good characteristics in neutronic physics to fulfill the functional needs for energy generation, tritium breeding and nuclear waste transmutation. The COUPLE code was used to study the effects of the volumetric ratio of uranium to water and the neutron multiplying material in the fission blanket on the efficiency of the fusion neutron source. The results show that the harder the neutron energy spectrum in the fission blanket is, the higher the efficiency of the fusion neutron source is. The results also indicate that adding neutron multiplying material beryllium properly in the blanket is suitable for enhancing the efficiency of external neutron source. The progress achieved in this study has gained some insights of further improving the FFHR conceptual design.

**Key words** [fusion-fission](#) [hybrid](#) [reactor](#) [subcritical](#) [equipment](#) [neutron](#) [source](#) [efficiency](#) [energy](#) [generation](#) [tritium](#) [breeding](#)

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