

反应堆工程

## 矩形通道中两端固定柔性单板湍流微振的研究

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收稿日期 修回日期 网络版发布日期:

**摘要** 平行板燃料组件的流致振动特性研究对于保证核反应堆的安全可靠运行具有重要意义。本文将平行板燃料组件简化成一个在矩形通道中两端固定的柔性单板结构, 研究其振动机理, 为研究平行板燃料组件的流致振动特性奠定基础。利用加速度传感器等测得实验用铝板的固有频率和弹性模量, 使用应变片和激光位移传感器测量平板在不同流速下的振动频率和位移。结果表明: 在目前的实验条件下, 平板的振动表现为一种由于湍流引起的复杂的随机振动; 平板在水中的振动位移随流速的增大而变大; 随着流速的增大, 平板振动加剧, 振动表现为低频成分减少, 高频成分增加。

**关键词** [平行板燃料组件](#) [固有频率](#) [流致振动](#) [湍流微振](#)

分类号

## Research on Turbulent Vibration of Double-Ends-Fixed Flexible Plate in Rectangular Channel

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**Abstract** Research on flow-induced vibration (FIV) of the parallel-plate fuel assembly plays an important role in the reactor safety analysis. In this paper, the vibration mechanism of a simplified double-ends-fixed flexible plate in the rectangular channel was researched, which lays the foundation for the flow-induced vibration research on the parallel-plate fuel assembly. In the experiment, the natural frequency and actual elastic modulus of the plate were investigated with an acceleration sensor, and the relative vibrant frequency and displacement were measured by strain gauges and laser displacement sensor in different velocities. The results indicate that the plate vibration in the water behaves as a complicated turbulence-induced one. The higher the velocity is, the bigger the vibration displacement is. With the velocity increasing, the plate vibrates severely. The low frequency reduces, while the high frequency increases.

**Key words** [parallel-plate](#) [fuel assembly](#) [natural frequency](#) [flow induced vibration](#) [turbulent vibration](#)

DOI

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