М. Р. Щербина*, К. О. Щербина, В. О. Тарасов,
С. І. Косенко, С. А. Чернеженко

Національний університет «Одеська політехніка», Одеса, Україна

*Відповідальний автор: mykhailo.shcherbyna@yahoo.com

ЧИСЛОВИЙ АНАЛІЗ САМОЖИВИЛЬНОЇ РУХОМОЇ ХВИЛІ ЯДЕРНОГО ПОДІЛУ, ПРОПАГОВАНОЇ НАДТЕПЛОВИМИ НЕЙТРОНАМИ В СЕРЕДОВИЩІ УРАНУ ДІКАРБІДУ

Досліджено саможивильну рухому хвилю ядерного поділу в середовищі урану дікарбіду через чисельне розв'язання системи диференціальних рівнянь. Основна увага приділяється рівнянню дифузії нейтронів та рівнянням балансу нуклідів, які є ключовими для розуміння поведінки хвиль поділу. Метою дослідження є визначення характеристик поширення та перевірка стабільності хвиль ядерного поділу. Числовий аналіз надає глибокі уявлення про динаміку розподілу нейтронів та зміну нуклідного складу, що є корисним у проєктуванні реакторів рухомої хвилі ядерного поділу.

Ключові слова: реактор рухомої хвилі ядерного поділу, надтеплові нейтрони, уран дікарбід, рівняння дифузії нейтронів, конструкція реактора, саможивильна хвиля поділу.

M. R. Shcherbyna*, K. O. Shcherbyna, V. O. Tarasov,
S. I. Kosenko, S. A. Chernezhenko

Odesa Polytechnic National University, Odesa, Ukraine

*Corresponding author: mykhailo.shcherbyna@yahoo.com

NUMERICAL ANALYSIS OF THE SELF-SUSTAINING TRAVELING WAVE OF NUCLEAR FISSION PROPAGATED BY EPITHERMAL NEUTRONS IN URANIUM DICARBIDE MEDIUM

This study investigates the self-sustaining traveling wave of nuclear fission in a uranium dicarbide medium by numerically solving a system of partial differential equations. The primary focus is on the neutron diffusion equation and nuclide balance equations, which are crucial for understanding the behavior of fission waves. By solving these equations, we aim to determine the propagation characteristics and assess the stability of nuclear fission waves in uranium dicarbide. Numerical analysis provides significant insights into the dynamics of neutron distribution and nuclide evolution, enhancing our understanding of the underlying physical processes and their implications for traveling wave reactor design.

Keywords: traveling wave reactor, epithermal neutrons, uranium dicarbide, neutron diffusion equation, reactor design, self-sustaining fission wave.

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