

Maintaining the Close-to-Critical State of Thorium Fuel Core of Hybrid Reactor Operated Under Control by D-T Fusion Neutron Flux

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Abstract:

The results of full-scale numerical experiments of a hybrid thorium-containing fuel cell facility operating in a close-to-critical state due to a controlled source of fusion neutrons are discussed in this work. The facility under study was a complex consisting of two blocks. The first block was based on the concept of a high-temperature gas-cooled thorium reactor core. The second block was an axially symmetrical extended plasma generator of additional neutrons that was placed in the near-axial zone of the facility blanket. The calculated models of the blanket and the plasma generator of D-T neutrons created within the work allowed for research of the neutronic parameters of the facility in stationary and pulse-periodic operation modes. This research will make it possible to construct a safe facility and investigate the properties of thorium fuel, which can be continuously used in the epithermal spectrum of the considered hybrid fusion-fission reactor.

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