

# HEAT TRANSFER AND HYDRODYNAMICS OF FLOWS IN VERTICAL CHANNELS WITH A PHASE TRANSITION

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The purpose of work is numerical investigation unsteady processes of heat transfer and fluid flow in channels which imitate active zone of nuclear reactor.

Multi-dimensional mathematical model of two-phase flow taking into account the effects of the phase transition was developed. Modified RNG  $k-\varepsilon$  model was used as a closing model. This model was modified on the basic of renormalization group analysis taking into account the unsteady thermal processes.

Simulation results for distribution of thermophysical and hydrodynamic characteristics in vertical channel are presented.

Thermo-hydraulic parameters variation in flow under malfunction conditions was analyzed. It allows determining time period before the crisis of heat transfer of first and second kind in vertical steam-generating channel, as well as time during which the temperature of the fuel element shell reaches value which allows by design conditions.