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## Advances in Computational Fluid Dynamics Modeling of Two Phase Flow in a Boiling Water Reactor Fuel Assembly

A new code, CFD-BWR, is being developed for the simulation of two-phase flow phenomena inside a BWR fuel bundle. These phenomena include coolant phase changes and multiple flow regimes which directly influence the coolant interaction with fuel assembly and, ultimately, the reactor performance. CFD-BWR is a specialized module built on the foundation of the commercial CFD code STAR-CD which provides general two-phase flow modeling capabilities. New models describing the inter-phase mass, momentum, and energy transfer phenomena specific for BWRs have been developed and implemented in the CFD-BWR module. A set of experiments focused on two-phase flow and phase-change phenomena has been identified for the validation of the CFD-BWR code and results of two experiment analyses focused on the radial void distribution are presented. The close agreement between the computed results, the measured data and the correlation results provides confidence in the accuracy of the models.

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