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Exploring the effect of temperature discontinuity at interfaces in transient liquid-vapor phase change processes[1] ANIRBAN CHANDRA, Rensselaer Polytechnic Institute, ZHI LIANG, California State University, Fresno, ASSAD OBERAI, University of Southern California, ONKAR SAHNI, PAWEL KEBLINSKI, Rensselaer Polytechnic Institute — Quantitative prediction of the rate of phase change in micro/meso-scale systems requires proper boundary conditions at the interface between phases. It was recently shown that the temperature jump at phase interfaces does not alter the mass fluxes significantly in a quasi-steady state condition; however, a dissimilar temperature profile was observed with the assumption of temperature continuity/discontinuity. In this study, we explore the effect of temperature discontinuities at liquid-vapor interfaces before the system reaches a quasi-steady state. We use a locally discontinuous finite element method to solve the 3D compressible Navier-Stokes equations while correctly accounting for jump-conditions across phase interfaces using explicit interface tracking and discontinuous interpolation only at the interface. Expressions for temperature jumps and phase change rates are obtained from theoretical considerations and augmented by MD simulations.

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