Abstract Submitted
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A lattice based approach for simulation of multiphase flows with phase transitions[1] ABDELAZIZ ALIAT, PRAKASH VEDULA, University of Oklahoma, Norman — We present a lattice based approach to address challenges due to nonequilibrium behavior in liquid-vapor flows with phase transitions. The effects of phase transitions are accounted for via an interaction potential that is treated as a combination of a short range repulsion model based on hard sphere interactions and a long range attraction tail based on mean field models. Particle distribution functions are evolved based on the Boltzmann equation with the full collision operator and a self-consistent force field. Our numerical implementation of this approach involves quadrature-based analytical approximations of moments due to the full collision operator and second-order accurate approximations to convective fluxes (including flux limiters). The results obtained from this approach will be compared with those from other approaches based on standard Lattice Boltzmann Method for simulation of phase transitions in selected canonical flows using different mean-field models. Generalizations of our proposed approach for accurate simulation of heat transfer rates based on high-order lattice representations will also be discussed.

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