Dynamics of a high viscosity layer in response to shear flow\textsuperscript{1}

EHSAN ESMAILI, ANNE STAPLES, Virginia Tech — We use the Shan-Chen multicomponent Lattice Boltzmann method (LBM) to investigate the time evolution of a thin liquid film (phase I) coating a solid surface under the action of a shearing force imposed by a surrounding fluid (phase II), whose viscosity is significantly lower than that of the film. The goal of this study is to use LBM to capture the contact line motion and interfacial dynamics for an oil-like liquid film which is driven by the upper phase (water) movement as a first approach to modeling thin film dewetting in wave swept marine environments. Lubrication theory is used to validate the results for the driven thin film, and the LBM simulations investigate the effects of the upper phase movement, lower phase thickness, and angle of the imposed shearing force on the thin film profile.

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