

Abstract Submitted
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Non-local surface tension model for N-phase flows¹ AMANDA HOWARD, ALEXANDRE TARTAKOVSKY, Pacific Northwest National Laboratory — We propose a nonlocal model for surface tension obtained in the form of an integral of a molecular-force-like function added to the Navier-Stokes momentum conservation equation for N-phase fluid flows. We demonstrate that our model recovers both microscale and macroscale features of multiphase flow, eliminating the need for expensive hybrid MD-NS models, and providing strong advantages for modeling multiphase flows at length scales not feasible with MD simulations. We present benchmark cases for the nonlocal model with comparisons to the level set method for N-phase flows and fluid-fluid-solid flows. Results are shown to be in agreement with analytical and previous numerical results.

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