Multiscale SPH model for multiphase flow\textsuperscript{1} ALEXANDRE TAR-TAKOVSKY, AMANDA HOWARD, Pacific Northwest National Laboratory — We present nonlocal multiscale partial differential equations for multiphase flow and their smoothed particle hydrodynamics (SPH) discretization. We demonstrate that this model is able to describe multiphase flow at scales ranging from micro (nano) to macro scales and predicts curvature dependence of the surface tension. The nonlocal model is obtained in the form of an integral of a molecular-force-like function added into the momentum conservation equation. Our SPH simulations of multiphase flow in porous materials and droplet and film flow on rough surfaces further reveal multiscale features of the proposed model.

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