Abstract Submitted
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A Dual-Scale Approach for Modeling Turbulent Two-Phase Interface Dynamics[1] MARCUS HERRMANN, Arizona State University — Turbulent liquid/gas phase interface dynamics are at the core of many applicatons. For example, in atomizing flows, the properties of the resulting liquid spray are determined by the interplay of fluid and surface tension forces. The resulting dynamics typically span 4-6 orders of magnitude in length scales, making DNS exceedingly expensive. This motivates the need for modeling approaches based on spatial filtering or ensemble averaging. In this talk, a dual-scale modeling approach is presented to describe turbulent two-phase interface dynamics in a LES-type spatial filtering context. To close the unclosed terms related to the phase interface arising from filtering the Navier-Stokes equation, a resolved realization of the phase interface dynamics is explicitly filtered. This resolved realization is maintained on a high resolution over-set mesh using a Refined Local Surface Grid approach employing an un-split, geometric, bounded, and conservative Volume of Fluid method. The required model for the resolved realization of the interface advection velocity includes the effects of sub-filter surface tension, dissipation, and turbulent eddies. Results of the dual-scale model will be compared to recent DNS by McCaslin & Desjardins of an interface in homogeneous isotropic turbulence.

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