

Abstract Submitted  
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**Interface Surface Area Tracking for the Conservative Level Set Method**<sup>1</sup> STEPHANIE FIREHAMMER, OLIVIER DESJARDINS, Sibley School of Mechanical and Aerospace Engineering, Cornell University — One key question in liquid-gas flows is how to model the interface between phases in a way that is mass, momentum, and energy conserving. The accurate conservative level set (ACLS) method of Desjardins et al. [O. Desjardins, V. Moureau, H. Pitsch, An accurate conservative level set/ghost fluid method for simulating turbulent atomization, *J. Comput. Phys.* 227 (18) (2008) 8395-8416] provides a tool for tracking a liquid-gas interface with minimal mass conservation issues; however, it does not explicitly compute the interface surface area and thus nothing can be said a priori about the balance between kinetic energy and surface energy. This work examines an equation for the transport of interface surface area density, which can be written in terms of the gradient of the volume fraction. Furthermore this presentation will outline a numerical method for jointly transporting a conservative level set and surface area density. Finally, we will explore opportunities for energy conservation via the accurate exchange of energy between the flow field and the interface through surface tension, with test cases to show the results of our extended ACLS method.

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