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**Comparing volume of fluid and level set methods for evaporating liquid-gas flows** JOHN PALMORE, OLIVIER DESJARDINS, Cornell University — This presentation demonstrates three numerical strategies for simulating liquid-gas flows undergoing evaporation. The practical aim of this work is to choose a framework capable of simulating the combustion of liquid fuels in an internal combustion engine. Each framework is analyzed with respect to its accuracy and computational cost. All simulations are performed using a conservative, finite volume code for simulating reacting, multiphase flows under the low-Mach assumption. The strategies used in this study correspond to different methods for tracking the liquid-gas interface and handling the transport of the discontinuous momentum and vapor mass fractions fields. The first two strategies are based on conservative, geometric volume of fluid schemes using directionally split and un-split advection, respectively. The third strategy is the accurate conservative level set method. For all strategies, special attention is given to ensuring the consistency between the fluxes of mass, momentum, and vapor fractions. The study performs three-dimensional simulations of an isolated droplet of a single component fuel evaporating into air. Evaporation rates and vapor mass fractions are compared to analytical results.

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