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Large eddy simulation of cavitating mixing layer: the effect of splitter plate KAMESWARARAO ANUPINDI, DINESH SHETTY, STEVEN FRANKEL, Purdue University — The accurate prediction and validation of various cavitation mechanisms such as internal jets, cavity extent etc., play an important role in furthering the reliability of simulations. Previous simulation studies¹ point out a need for high resolution solver. Therefore, in the present study we perform high order large eddy simulation (LES) study on a turbulent incompressible mixing layer operating under cavitating and non-cavitating conditions. The solver is based on incompressible Navier-Stokes formulation, in which a single fluid, two-phase mixture is solved with a separate liquid volume fraction (α_l) equation coupled with a mass-transfer model. We first validate our solver by making comparisons to experimental results². Various quantities such as similarity velocity profiles, mean vapor fraction ratio profiles, and the evolution of vorticity thickness are compared. Having validated the solver, we include the splitter plate in the simulations through immersed boundary method approach and study the effect of the wake created by it on the cavitating mixing layer dynamics.

¹Bensow et al. J. Fluids Engg., **132**, 041302 (2010)

²Aeschlimann et al. Phys. Fluids, **23**, 055101 (2011)

Kameswararao Anupindi
Purdue University

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