Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

An acoustically accurate method to simulate turbulent cavitating flows[1] ASWIN GNANASKANDAN, KRISHNAN MAHESH, University of Minnesota — An acoustically accurate method involving transport of energy equation has been developed to simulate cavitating flows to study sheet to cloud cavitation transition in complex geometries. The algorithm uses a compressible homogeneous equilibrium model and solves transport equation for the vapor's mass fraction along with the compressible Navier-Stokes equation for the mixture. The internal energy equation is demonstrated to discretely outperform the total energy equation. A novel characteristic based filtering method has been developed for multiphase flows and is applied in a predictor-corrector approach, ensuring zero dissipation away from discontinuities. A dynamic Smagorinsky model is used for both Navier Stokes and the scalar transport equation. The algorithm has been validated for a variety of problems. Details of the methodology along with simulation results will be discussed.

[1]This work is supported by the Office of Naval Research

Aswin Gnanaskandan
University of Minnesota

Date submitted: 01 Aug 2013 Electronic form version 1.4