Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Shock wave-free interface interaction ROMAN FROLOV, PETER MINEV, ROUSLAN KRECHETNIKOV, University of Alberta — The problem of shock wave-free interface interaction has been widely studied in the context of compressible two-fluid flows using analytical, experimental, and numerical techniques. While various physical effects and possible interaction patterns for various geometries have been identified in the literature, the effects of viscosity and surface tension are usually neglected in such models. In our study, we apply a novel numerical algorithm for simulation of viscous compressible two-fluid flows with surface tension to investigate the influence of these effects on the shock-interface interaction. The method combines together the ideas from Finite Volume adaptation of invariant domains preserving algorithm for systems of hyperbolic conservation laws by Guermond and Popov and ADI parallel solver for viscous incompressible NSEs by Guermond and Minev. This combination has been further extended to a two-fluid flow case, including surface tension effects. Here we report on a quantitative study of how surface tension and viscosity affect the structure of the shock wave-free interface interaction region.

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Date submitted: 22 Jul 2016 Electronic form version 1.4