Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Tracking the front of the Rayleigh-Taylor Unstable Interface XIAOLIN LI, SUNY at Stony Brook, BRIAN FIX TEAM, JAMES GLIMM TEAM, YUANHUA LI TEAM, XINFENG LIU TEAM — We describe our recent renovation of the Front Tracking package, especially in the 3D handling of topological bifurcations. We also assess the performance of the package, in comparison with publicly distributed interface codes(the level set method), with published performance results (VOF and other methods) and with previous versions of front tracking. The major new algorithm presented here is Locally Grid Based tracking(LGB), which combines the best features of two previous 3D tracking algorithms. It combines the robustness of grid based tracking with the accuracy of grid free tracking, and thus it is a significant improvement to both of these algorithms. We also discuss the surface curvature and normal algorithms and a higher order propagation algorithm,used for the comparison studies presented here. This new front tracking code has now been used for more detailed study of the Rayleigh-Taylor instability with controlled experiments on physical surface tension and mass diffusion. We have found significant improvement on the accuracy of the fluid mixing rate with the experiment.

Xiaolin Li
SUNY at Stony Brook

Date submitted: 12 Aug 2005 Electronic form version 1.4