

Abstract Submitted  
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**Tracking the front of the Rayleigh-Taylor Unstable Interface XI-**  
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YUANHUA LI TEAM, XINFENG LIU TEAM — We describe our recent renovation  
of the Front Tracking package, especially in the 3D handling of topological bifurca-  
tions. We also assess the performance of the package, in comparison with publicly  
distributed interface codes(the level set method), with published performance re-  
sults (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 ex-  
periments on physical surface tension and mass diffusion. We have found significant  
improvement on the accuracy of the fluid mixing rate with the experiment.

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