Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Interface node behavior due to nonlinearities in a 2D Rayleigh-Taylor instability[1] MARIE-CHARLOTTE RENOULT, University of Le Havre, CHARLES ROSENBLATT, Case Western Reserve Univ, PIERRE CARLES, Universite Pierre et Marie Curie — We report a quantitative study on the symmetry effect of nonlinearities in a typical Rayleigh-Taylor (RT) instability for a single-mode sinusoidal initial perturbation. We use the interface zero-crossings (nodes) to monitor the asymmetrical deformation of the interface due to the growth of nonlinear odd harmonics. A weakly nonlinear model is developed and compared to measurements of node positions in fourteen RT experiments performed using the magnetic levitation technique. Our results suggest that monitoring the nodes' spatial displacement over time is a powerful technique for detecting the first nonlinear harmonic, and more broadly, exploring the transitional regime between linearity and fully-developed nonlinearity. The nodes approach provides a metric complementary to the deformation amplitude, which is widely used to measure the amplitude effect of nonlinearities in most interface instabilities.

[1]Acknowledgments: International Relations UPMC, Partner University Fund, Fulbright Foundation

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Date submitted: 30 Jul 2014 Electronic form version 1.4