Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Late-time evolution of Rayleigh-Taylor instability in a domain of a finite size[1] SNEZHANA ABARZHI, University of Chicago — For the first time a theoretical analysis was developed to systematically study the late-time evolution of Rayleigh-Taylor instability in a domain of a finite size. The nonlinear dynamics of fluids with similar and contrasting densities are considered for two-dimensional and three-dimensional flows driven by sustained or time-dependent acceleration. The flows are periodic in the plane normal to the direction of acceleration and have no external mass sources. Group theory analysis is applied to accurately account for the mode coupling. Asymptotic nonlinear solutions are found to describe the interface dynamics far from the boundaries and near the boundaries. The influence of the size of the domain on the diagnostic parameters of the flow is identified. In particular, it is shown that in a finite size the domain the flow is decelerating compared to spatially extended case. The theory outcomes for the numerical modeling of Rayleigh-Taylor instability and for the design of experiments in high energy density plasmas are discussed.

[1]The work is supported by the US National Science Foundation and by the US Department of Energy.

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Date submitted: 16 Jul 2011 Electronic form version 1.4