Wavelet-Based Simulations of Single-Mode Rayleigh-Taylor Instability  
SCOTT J. RECKINGER, DANIEL LIVESCU, OLEG V. VASILYEV  
— The single-mode compressible Rayleigh-Taylor instability is investigated using  
numerical simulations on an adaptive mesh, performed with the Adaptive Wavelet  
Collocation Method (AWCM). Due to the physics-based adaptivity and direct error  
control of the method, AWCM is ideal for resolving the wide range of scales present  
in the development of the instability. The problem is initialized consistent to the  
solutions to the linear stability theory. Of interest are the departure time from the  
linear growth, the onset of strong non-linear interactions, and the late-time behavior  
of the fluid structures. The late time bubble/spike velocities are computed and  
compared to those obtained in the incompressible case.

1This work was made possible by funding from the LDRD program at Los Alamos National Laboratory through project numbers 20070195ER and 20090058DR.