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Computational study of the interactions of two bubbles along an interface undergoing the Richtmyer-Meshkov instability[1] MICHAEL WADAS, ERIC JOHNSEN, University of Michigan — In addition to its prevalence in astrophysics, the shock-driven growth of interfacial perturbations (the Richtmyer-Meshkov instability, or RMI) has important practical consequences in applications of fusion research. Our objective is to numerically investigate the generation of vortex dipoles that escape the confines of the mixing region, as well as the reacceleration of bubbles, by focusing on the interaction of two adjacent bubbles of different sizes subjected to the RMI. Our hypothesis is that the escape of a vortex dipole can be predicted from the initial conditions based on the vorticity associated with the bubbles. Simulations are performed using an in-house, high-order accurate Discontinuous-Galerkin code. We demonstrate deviations from existing bubble merging models in the non-linear regime caused by the interaction of adjacent pairs of spikes, which had not previously been considered. We further develop a criterion that predicts the regime that will emerge for a given interface.

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