

Abstract Submitted
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Studies of bubble dispersion¹ SOUVIK BISWAS, GRETAR TRYGGVASON, Worcester Polytechnic Institute — Considerable effort has been devoted to the study of the turbulent dispersion of small bubbles and particles by turbulent flows. While the bubbles and particles may modify the flow somewhat, the primary effect is a one-way coupling from the fluid to the particles. When the response time of the particles is comparable to the time scales of the fluid motion the effect of the bubbles on the fluid cannot be ignored. Here we examine, using direct numerical simulations, the dispersion of buoyant bubbles rising in quiescent flow, or simple horizontal shear, where every continuum length and time scale are fully resolved. The fluid motion disperses the bubbles, but the bubbles are responsible for the fluid motion, as they rise. At the moment most of our results are for two-dimensional flows and we examine the dispersion by following the motion of several tens of bubbles as they rise across a horizontal channel. The results show that the dispersion is reasonably insensitive to the initial distribution of the bubbles and the length of the channel. Weak shear has essentially no effect on the dispersion.

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