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Investigation of bubble entrainment by breaking waves in turbulent two-phase Couette flows[1] DOKYUN KIM, ALI MANI, PARVIZ MOIN, CTR, Stanford University — The bubbles entrained by breaking waves have an important role in understanding the upper-ocean physical processes. Although the size distribution of bubbles is most important in these processes, its characteristics have not been clearly understood because measurement of the bubble size is challenging especially in the high void-fraction region. In the present study, numerical simulations are performed to investigate the bubble formation mechanism in breaking waves of turbulent two-phase flow with moving side-walls. A newly developed conservative VOF method[2] coupled to a subgrid Lagrangian breakup model is used to resolve wave breakup phenomenon and resulting bubbles. The numerical method is tested and validated against the experiments for canonical problems. The Reynolds and Froude numbers considered are 12,760 and 6.8, respectively. In order to investigate the effect of Weber number on the characteristics of the bubble size, the simulations are conducted for two different Weber numbers. The statistics and scale properties of bubbles will be presented and discussed.

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[2]Developed at Cascade Technologies

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