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Numerical study of wave breaking and bubble generation in turbulent two-phase Couette flow[1] DOKYUN KIM, ALI MANI, PARVIZ MOIN, CTR, Stanford University — The objective of the present study is to understand the formation of bubbles due to boundary layer/free-surface interactions. Numerical simulations are performed on a turbulent two-phase Couette flow configuration. A level set method coupled to a subgrid breakup model is used to capture the wave breakup and bubble formation. The free surface is tracked by the level-set method, while small subgrid liquid drops and air bubbles produced from resolved ligaments are transferred from the level-set representation to the Lagrangian representation. The Reynolds and Weber numbers considered are 12,760 and 41,600, respectively, based on water properties. In order to investigate the effect of Froude number on the characteristics of wave breaking and bubble formation, the simulations are done for two different Froude numbers - Fr = 3.9 and 6.8. The statistical data including wave amplitude and bubble size distribution will be presented. The effect of grid resolution on the bubble size distribution will be discussed.

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