Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Ascending dynamics of a swarm of drops in a stratified fluids[1]
AREZOO ARDEKANI, MORTEZA BAYAREH, SADEGH DABIRI, University of Notre Dame — The motion of drops and bubbles in stratified fluids has several natural and industrial applications such as bubbles rising across pycnoclines in marine and aquatic environments, oil spills, ocean sequestration of CO2, and bubble mixers used for lake/reservoir destratification and aeration. Even though the motion of bubbles and drops in a homogenous fluid has been extensively studied, their motion in a stratified fluid has not been explored. We perform direct numerical simulation of three-dimensional motion of a swarm of drops rising in a linearly stratified fluid. The pair correlation function is calculated to characterize the microstructure formation. The results show stronger tendency to form horizontal clusters of drops in a stratified fluid compared to a homogenous fluid. The mean rise velocity of the swarm of drops is reduced compared to the one in a homogenous fluid.

[1]This work is supported by National Science Foundation Grant CBET-1066545.

Arezoo Ardekani
University of Notre Dame

Date submitted: 01 Aug 2013 Electronic form version 1.4