

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Response of Evaporating Droplets to Vortices ANU V. S. NATH, Indian Institute of Technology Madras, RAMA GOVINDARAJAN, <https://www.icts.res.in/>, S RAVICHANDRAN, <https://www.nordita.org/people/staff/index.php?u=ravichandran.sivaramakrishnan>, ANUBHAB ROY, <https://apm.iitm.ac.in/anubhab.html> — We study the dynamics of small water droplets in vortical airflow and explore the important differences between the collective dynamics of individual droplets and those of merely a heavier phase of the fluid. We had shown earlier ([1],[2]) that heavy droplets getting centrifuged out of vortices can form caustics (cross each other) within a certain radius, and that this can make a big difference to the collision and coalescence. We now explore how evaporation/ condensation affects this process, given that the Stokes number of each droplet changes as phase change proceeds. We also discuss how the resulting buoyancy injection modifies the flow itself, in model three-dimensional vortical flows as well as in turbulence. References [1] Ravichandran, S., Govindarajan, R. (2015). Caustics and clustering in the vicinity of a vortex. *Physics of Fluids*, 27(3), 033305. [2] Govindarajan, R., Ravichandran, S., Ray, S., Deepu, P. (2016). Caustics and the growth of droplets. *APS*, 2016, K53-005.

Anu Nath
Indian Institute of Technology Madras

Date submitted: 03 Aug 2020

Electronic form version 1.4