

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Vortex droplet co-axial interaction: insights into the vortex dynamics SHUBHAM SHARMA, AWANISH PRATAP SINGH, SAPTARSHI BASU, Indian Institute of Science — This experimental work is focused on the vortex dynamics observed during the co-axial interaction of a vortex ring with an incoming droplet. The complete progression of collision is sub-divided into three regimes which include deformation (regime-I), stretching and engulfment (regime-II) and break-up (regime-III) of the droplet. A slug of fluid is injected into a stagnant fluid stored in a chamber for generating vortex rings. The injection pressure of the fluid is varied to obtain different values of circulation (Γ) strength (45- 161 cm²/sec). We have investigated the effect of the interaction on different characteristics of vortex rings, which includes pressure distribution, vorticity distribution, circulation strength, total energy, and total enstrophy. It was noticed that collision leads to a significant reduction in these parameters. The reduction in these characteristics is more (~30%) at lower vortex ring strengths.

Shubham Sharma
Indian Institute of Science

Date submitted: 03 Aug 2020

Electronic form version 1.4