Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Characteristics of coalescence mechanism of two unequal sized drops at liquid-liquid interface. SWATI SINGH, ARUN K. SAHA, Indian Institute of Technology Kanpur, Kanpur , India — The drop coalescence is important in many applications such as formation of rain drops in cloud and mixing in microdevices. In the present work, the dynamics of satellite drop generation during the coalescence of two drops of unequal size are studied. The mechanism depends on five non-dimensional parameters: Ohnesorge number for both liquids, Bond number, Atwood number and the diameter ratio of two drops. We have performed two-dimensional, axisymmetric simulations using Coupled Level set and Volume of fluid method (CLSVOF) to unveil the underlying physics of coalescence process under varying drop diameter ratio (1.0-9.0) and Ohnesorge number. The Bond number is kept less than 0.1. Result shows the three different pinch-off scenario depending on drop diameter ratio: (i) the mother drop deforms after coalescence resulting in necking and subsequent satellite drop pinches off following the similar sequence as that of a drop coalescence with a flat liquid pool, (ii) occurrence of mother drop pinch-off happens with necking but without intermediate detachment of satellite drop, (iii) mother drop completely coalesces into the father drop without any evidence of satellite drop generation.

Swati Singh
Indian Institute of Technology Kanpur, Kanpur , India

Date submitted: 26 Jul 2019 Electronic form version 1.4