

Dual residence time for droplet to coalesce with liquid surface

Wednesday, 13 March 2024 15:55 (5 minutes)

When approaching a liquid surface, droplets have a tendency to merge in order to minimize the surface energy. However, they can exhibit a phenomenon called coalescence delay in most cases that keeps them floating for tens of milliseconds. The duration is known as the residence time or the non-coalescence time. Surprisingly, under identical parameters and initial conditions, the residence time for water droplets is not a constant value but exhibits dual peaks in its distribution. In this poster, we present the observation of the dual residence times through rigorous statistical analysis and investigate the quantitative variations in residence time by manipulating parameters such as the droplet height, radius, and viscosity. Theoretical models and physical arguments are provided to explain their effects, particularly why a large viscosity or/and a small radius is detrimental to the appearance of the longer residence time peak.

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Session Classification: Poster

Track Classification: Poster section