Evaporating Organic Liquid Droplets on Nonwetting Surfaces

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**Objective**

Investigate the flow fields and thermal energy transport inside organic liquid droplets evaporating on a nonwetting substrate.

**Approach**

- Use particle image velocimetry to measure the velocities inside the droplet.
- A reduced-order finite volume model is used to characterize the evaporation of the droplet.

**Impact**

- Establish that Marangoni convection is the driving mechanism for organic liquid droplet on nonwetting substrate.
- Show that advection (as opposed to thermal diffusion) is a dominant mechanism in the internal thermal energy transport.
- Develop a reduced-order model that accurately captures the evaporative behavior of the droplet by incorporating the thermal transport inside the droplet.

**Selected Publications**


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![Velocity vector field](image)

![Streakline image](image)

(a) Velocity vector field (from PIV analysis) within a 1.34 μL droplet on a substrate fixed at 10 °C, and (b) the centerline vertical velocity taken along the y-axis at x = 0. (c) A streakline image is obtained from superimposing images of the tracer particles.