# Marangoni Bursting*

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A droplet placed on a liquid surface usually spreads or stays intact, but under certain conditions, it bursts into smaller droplets, scattering across the surface. This effect, known as Marangoni bursting, is driven by surface tension gradients and evaporation.

Figure 1: Set-up.

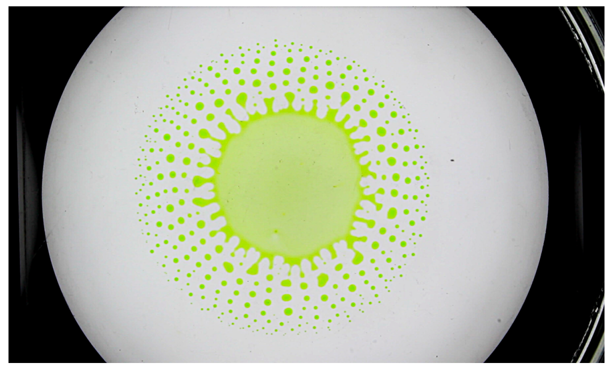

Figure 2: Sample image of drop bursting into smaller droplets.

The experiment consists of placing IPA (isopropanol)-water mixtures with varying mass fractions of IPA onto a 0.8–1 cm layer of sunflower oil in a petri dish placed on a light box with transparent acrylic sheet on top. Observations are recorded using a high-resolution camera attached on a stand. Use Tracker software to measure the mother droplet radius $r_m$ and outer radius $r_o$ over time for different IPA concentrations.

**[Q 1.]** Water and oil do not mix. What changes as alcohol is introduced into the water droplet? How does this affect its interaction with oil?
**[Q 2.]** Plot $r_m$ and $r_o$ as functions of time. Normalize the data by dividing each value by its maximum observed value. What does the normalized graph indicate about the spreading and bursting behavior?
**[Q 3.]** Is there a threshold mass fraction of IPA beyond which bursting occurs? Determine this threshold.
**[Q 4.]** What changes do you observe as you vary the mass fraction of IPA in the droplet? How does it influence the bursting dynamics?

## References

[1] Keiser et al., *Phys. Rev. Lett.* **118**, 074504 (2017). `https://doi.org/10.1103/PhysRevLett.118.074504`

[2] Durey et al., *APS DFD - Gallery of Fluid Motion* (2017). `https://doi.org/10.1103/APS.DFD.2017.GFM.V0020`