

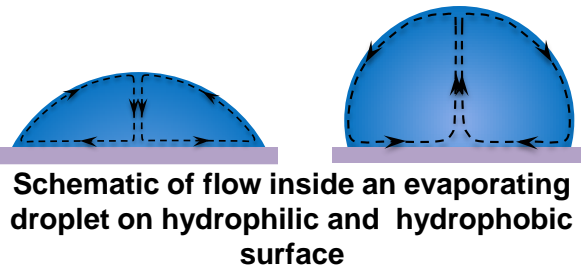
# Flow Field Mapping during Droplet Evaporation on Hydrophobic and Superhydrophobic Surfaces

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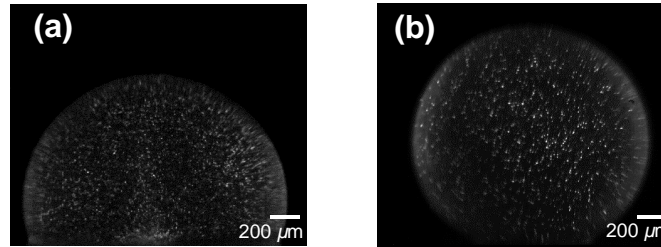
## OBJECTIVE

Quantitative evaluation of flow field inside a droplet evaporating on a heated hydrophobic and superhydrophobic substrate

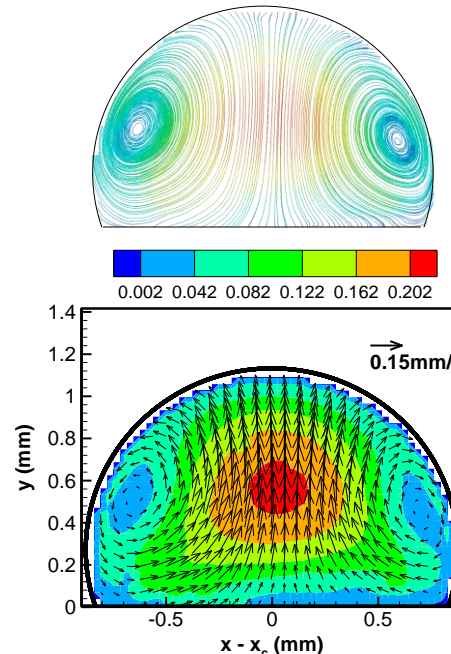


## APPROACH

- Use PIV technique for accurate estimation of flow field inside the droplet during evaporation
- Evaluation of the effect of substrate temperature and droplet size on the convective flow
- Implementation of image correction to account for distortion of velocity vectors due to lens effect of the droplet



Droplet seeded with fluorescent particles evaporating on (a) hydrophobic and (b) superhydrophobic surface



Representative streamlines and velocity vectors in droplet during evaporation on hydrophobic substrate

## IMPACT

- Better understanding of evaporation induced mixing in droplets
- Determining the relationship between flow behavior and particle deposition

## SELECTED PUBLICATIONS

- S. Dash and S. V. Garimella, "Droplet Evaporation Dynamics on a Superhydrophobic Surface with Negligible Hysteresis," *Langmuir* Vol. 29, pp 10785-10795, 2013.
- Z. Pan, S. Dash, J. Weibel, S. V. Garimella, "Assessment of Water Droplet Evaporation Mechanisms on Hydrophobic and Superhydrophobic Substrates," *Langmuir*, DOI: 10.1021/la4045286, 2013.
- S. Dash, A. Chandramohan, J. Weibel and S.V. Garimella, "Flow Visualization of Droplet Evaporation on a Hydrophobic Surface," *Proceedings of the ASME IMECE2013, San Diego (Poster)*