Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Evaporation dynamics of non-spherical sessile drops of pure fluids and binary mixtures[1] PEDRO J. SAENZ, OMAR K. MATAR, Imperial College London, KHELLIL SEFIANE, PRASHANT VALLURI, The University of Edinburgh, JUNGHO KIM, The University of Maryland — The dynamics of pure axisymmetric volatile sessile droplets have been meticulously examined over the last four decades but remain poorly understood. Studies focusing on more realistic non-spherical configurations are virtually non-existent. The dynamics of the latter are examined in this investigation by means of experiments and numerical simulations. We show that the lifetime and bulk flow characteristics of these drops depend on their size and shape. The irregular geometries lead to the emergence preferential convection currents in the liquid as well as differential local evaporation rates noticeable along the contact line. Similarly, we inspect the thermocapillary stability of the flow, which results as the liquid volatility increases, and find that this is also affected by the non-uniform wettability along the triple line. The Marangoni-driven instabilities grow in an intricate spatio-temporal fashion leading to the emergence of different flow regimes. Finally, we also provide new insights into the evaporation process of binary-mixture drops.

[1]Memphis Multiphase (EPSRC EP/K003976/1) & ThermaPOWER (EU IRSES-PIRSES GA-2011-294905)

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Date submitted: 17 Jul 2015 Electronic form version 1.4