Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Vapor mediated droplet interactions - models and mechanisms (Part 2) ADRIEN BENUSIGLIO, NATE CIRA, MANU PRAKASH, Stanford University Department of Bioengineering — When deposited on clean glass a two-component binary mixture of propylene glycol and water is energetically inclined to spread, as both pure liquids do. Instead the mixture forms droplets stabilized by evaporation induced surface tension gradients, giving them unique properties such as negligible hysteresis. When two of these special droplets are deposited several radii apart they attract each other. The vapor from one droplet destabilizes the other, resulting in an attraction force which brings both droplets together. We present a flux-based model for droplet stabilization and a model which connects the vapor profile to net force. These simple models capture the static and dynamic experimental trends, and our fundamental understanding of these droplets and their interactions allowed us to build autonomous fluidic machines.

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Date submitted: 01 Aug 2014 Electronic form version 1.4