

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Numerical simulations of evaporative instabilities in sessile drops of ethanol on heated substrates SERGEY SEMENOV, FLORIAN CARLE, MARC MEDALE, DAVID BRUTIN, Aix-Marseille University - IUSTI — The work is focussed on numerical simulations of thermo-convective instabilities in evaporating pinned sessile droplets of ethanol on heated substrates. Computed evaporation rate of a droplet is validated against parabolic flight experiments and semi-empirical theory presented here. To the best authors' knowledge, this is the first study which combines theoretical, experimental and computational approaches in convective evaporation of sessile droplets. The influence of gravity level on evaporation rate and contributions of different mechanisms of vapor transport (diffusion, Stefan flow, natural convection) are shown. The qualitative difference (in terms of developing thermo-convective instabilities) between steady-state and unsteady numerical approaches is demonstrated.

David BRUTIN
Aix-Marseille University - IUSTI

Date submitted: 24 Jul 2015

Electronic form version 1.4