

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Leidenfrost drops on liquid baths : experiments LAURENT MAQUET, BAPTISTE DARBOIS-TEXIER, ALEXIS DUCHESNE, MARTIN BRANDENBOURGER, STPHANE DORBOLO, GRASP, Universit de Lige, Lige, Belgium, BENJAMIN SOBAC, ALEXEY REDNIKOV, PIERRE COLINET, TIPS, Universit Libre de Bruxelles, Bruxelles, Belgium, GRASP, UNIVERSIT DE LIGE, LIGE, BELGIUM TEAM, TIPS, UNIVERSIT LIBRE DE BRUXELLES, BRUXELLES, BELGIUM TEAM — In the Leidenfrost effect, a liquid drop stands above a very hot substrate and levitates over a bed of its own vapor. Recently, the use of these drops has shown rather interesting possibilities, and better understanding of this effect thus appears necessary. Roughness generally leads to an increase of the Leidenfrost temperature. Therefore, the idea of our work is to use the smoothest substrate possible: a liquid bath. Indeed, we observed stable Leidenfrost drops with superheat (difference between the temperature of the bath and the boiling temperature of the drop's liquid) down to 1°C. This remarkable behavior has been seen notably for ethanol drops on silicon oil baths. However, the viscosity of the liquid of the bath seems to play an important role as no ethanol drop can be in the Leidenfrost state over high viscosity baths (kinematic viscosity $\nu \sim 200$ cSt). This may be due to local cooling of the substrate under the drop. We also investigate the evaporation of these drops, and find scalings markedly different from those applying in the case of a solid substrate. We also observe that the drop can enter in contact with the bath before its complete evaporation if the temperature is not high enough.

Laurent Maquet
GRASP, Universit de Lige, Lige, Belgium

Date submitted: 27 Jul 2015

Electronic form version 1.4