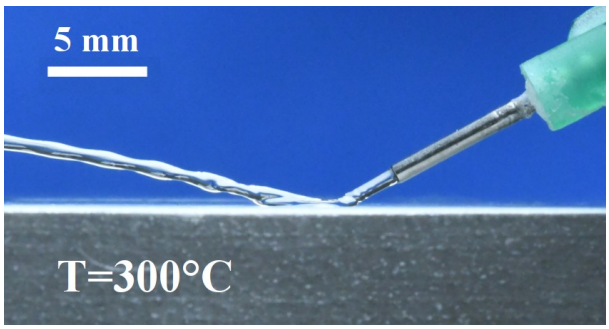
M1 intership : Stability of Leidenfrost jets

Contacts : ***F. Celestini (franck.celestini@univ-cotedazur.fr)***
C. Raufaste (christophe.raufaste@univ-cotedazur.fr)
INPHYNI . Institut de Physique de Nice, CNRS, Université Côte d'Azur

The *'Complex Fluids'* team addresses issues at the intersection of fluid mechanics, soft matter, and nonlinear physics. We study, both experimentally and theoretically, systems where surface tension effects couple with inertial, thermal, or wave-like effects to create unique flow morphologies.
In recent years, we have published numerous studies on Leidenfrost droplets (see references 1. and 2.), and the goal of this internship will be to study this phenomenon, not for droplets, but for jets impacting surfaces heated well beyond the boiling temperature of the liquid. An article was recently published on this topic as part of D. Paulovics' thesis (references 3. and 4.). The aim of this internship is to extend this research by considering the effect of mechanical perturbations on these bouncing jets.



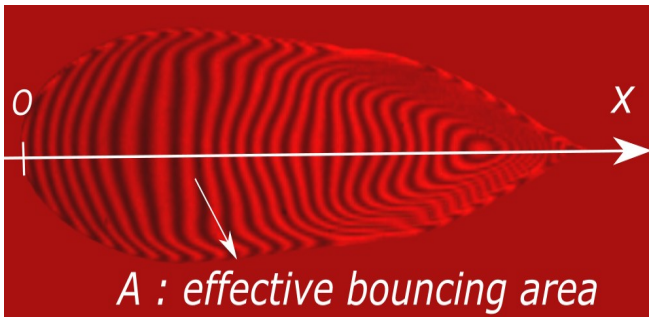


Figure : Left : millimeter-sized jet bouncing on a surface heated to 300°C. A thin vapor film insulates the liquid from the substrate. Right : interferometric pattern of the vapor width just below the liquid jet.

During this internship, the student will become familiar with image acquisition techniques using ultra-high-speed and/or thermal cameras, image processing, and the analysis of experimental data. He/She will also need to redesign the experimental setup to enable the vibration of heated surfaces.

References :

1- https://fr.wikipedia.org/wiki/Effet_Leidenfrost
2- https://www.pourlascience.fr/theme/gouttes-jets-et-physique-des-fluides/gouttes-deau-bondissantes-sur-pierre-brulante-11440.php
3- https://journals.aps.org/prfluids/abstract/10.1103/PhysRevFluids.9.L112001
4- https://www.newscientist.com/article/2455811-jets-of-liquid-bounce-off-hot-surfaces-without-ever-touching-them/