PHYSICAL MATHEMATICS SEMINAR

Surface Waves on Levitating Liquid

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ABSTRACT:

When a pool of water is deposited on a surface hotter than 200° C, it breaks into small drops that roll over the substrate with very little friction. The evaporation process of these drops lasts for a much longer time than expected the presence of a thin vapour layer sup- ports the liquid weight by lubrication force, and the evaporation is drastically limited by the poor thermal conductivity of the gas phase. However, this effect has long been limited to drop size, as larger levitating volumes lead to the formation of unstable gas pockets beneath which violently disturbs the liquid surface [1].

A few years ago we showed that this drop size limitation can be circumvented by using curved substrates [2]. A torus of water in levitation was then obtained, without any specific limitation in length or volume. Since then, we have tested various channel shapes to control the geometry of the puddle. We have applied this new way of designing levitating liquid puddles to the study of surface wave propagation. I will show in particular how two configurations (torus and cylinder) can be used to study linear and non-linear surface capillary waves, with a tunable effective gravity [3].

References:

[1] Biance A.L., Clanet C. and Quéré D. : Leidenfrost drops. *Phys. of Fluids*, **15** 6 (2003)
[2] Perrard S., Couder Y., Fort E. and Limat L. : Leidenfrost levitated liquid tori. *EPL* **100** 54066 (2012)
[3] Perrard S., L. Deike , E. Duchêne and Pham C.T. : Capilary solitons on a levitated medium. *PRE*, **92** 011002 (2015)

TUESDAY, APRIL 5, 2016
2:30 PM
Building 2, Room 136

Reception following in Building 2,
4th Floor-Common Area

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