GRADUATE STUDENT RESEARCH SEMINAR SERIES (2018)

INTRINSIC GEOMETRIC CONSTRAINTS OF SPONTANEOUSLY EXCITED LEIDENFROST DROPS

SPEAKER: JESSE BERGEN

Ripples appearing on the free surface of a perturbed body of water such as a lake are due to capillary effects at the air-water interface where surface tension acts to restore the disturbed surface. Here we fundamentally investigate capillary waves appearing on small liquid drops in the quiescent film boiling regime commonly referred to as the Leidenfrost effect. These drops have been reported to spontaneously oscillate in geometrical star-shaped patterns with a number of lobes *n* appearing along the drop periphery which generally corresponds to the circumference of the drop. Using six different liquids, we experimentally show that drops may be classified into two regimes based on drop size. Above a characteristic drop size, the frequency of oscillation is found to be constant for each liquid independent of drop size while smaller drops are found to oscillate with a larger dependence on drop size. A simplified theoretical model based on the polar Laplace equation is presented and shows agreement with experimental results.

MONDAY, OCTOBER 22 3:00 PM

EIB 132