Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Levitation of evaporating microscale droplets over solid surfaces VLADIMIR AJAEV, Southern Methodist University, DMITRY ZAITSEV, OLEG KABOV, Institute of Thermophysics, Russia — We develop an analytical model to describe recent experimental observations of levitation of evaporating microscale droplets over heated solid surfaces for temperatures far below the Leidenfrost point. Flow patterns around the droplet are determined. Formulas for levitation force are obtained and used to determine the levitation height as a function of drop radius. The results are compared to the predictions of models representing the droplets as point sources in the hydrodynamic equations and with the experimental data. Our model predictions are in good agreement with the experiments except for very small droplets which tend to levitate at higher than expected height.

Vladimir Ajaev
Southern Methodist University

Date submitted: 10 Aug 2020 Electronic form version 1.4