Winter 1-25-2014

The Effect of Acceleration on Nucleate Boiling and Bubble Departure Dynamics in Microgravity

Jenica Sparrow

Heng Ban
Utah State University

JR Dennison
Utah State University

Council On Undergraduate Research
LEARNING THROUGH RESEARCH
CUR
Posters on the Hill

The Effect of Acceleration on Nucleate Boiling and Bubble Departure Dynamics in Microgravity

Jenica Sparrow[1]
[Mentors: Heng Ban[1] and J.R. Dennison[2]]

[1]*Get-Away-Special Tea m*
Mechanical & Aerospace Engineering
Utah State University

[2]*Materials Physics Group*
Physics Department
Utah State University

Abstract

Microgravity is created whenever an object is in free-fall. With such minuscule amounts of gravity acting on an object, it experiences a sensation described as weightlessness. This project was designed to evaluate the significance of an environmental influence (very small background accelerations and acceleration changes) on the velocity, overall acceleration, and bubble departure rate in nucleate boiling, to better understand the process of heat transfer in microgravity. Based on the results of the FUNBOE 2.0 experiment, we concluded that small changes in gravity—such as those experienced on the NASA Weightless Wonder—are not sufficient to have any noticeable effect of buoyancy on the heat transfer rate.