



Fig. 1 False color images of boiling heat transfer in microgravity and Hi-g

## SUBCOOLED POOL BOILING HEAT TRANSFER IN MICROGRAVITY AND Hi-g

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An array of microscale heaters each  $0.27 \text{ mm} \times 0.27 \text{ mm}$  in size were held at constant temperature using electronic feedback loops, enabling the heat transfer from each heater to be determined. The above images were obtained by combining video images of boiling taken from below and adding false color according to the heat transfer from each heater in the array. The boiling behavior in microgravity and high-g (about 1.8 g) is shown on Fig. 1 at two wall superheats. The microgravity environment was provided by a KC-135. The bulk fluid (FC-72) was at 1 atm and subcooled by 35 K. The circle at the bottom right of each image shows the direction of the

acceleration vector within the plane of the image (the circle corresponds to 0.05 g). The x-direction is perpendicular to the image.

In microgravity, a large “primary” bubble surrounded by numerous smaller bubbles was observed. The primary bubble moved in a circular pattern on the heater array as it coalesced with the smaller bubbles. A dry spot formed underneath this primary bubble, as indicated by the low heat transfer. The size of the primary bubble increased with wall superheat. In high-g, numerous small bubbles that nucleate, grow, and detach very rapidly were observed.