Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Study on Fins' Effect of Boiling Flow in Millimeter Channel Heat Exchanger SATOSHI WATANABE, University of Tokyo, KOJI OKAMOTO, YASUYUKI IMAI, VISUALIZATION LABORATORY TEAM — Recently, a lot of researches about compact heat exchangers with mini-channels have been carried out with the hope of obtaining a high-efficiency heat transfer, due to the higher ratio of surface area than existing heat exchangers. However, there are many uncertain phenomena in fields such as boiling flow in mini-channels. Thus, in order to understand the boiling flow in mini-channels to design high-efficiency heat exchangers, this work focused on the visualization measurement of boiling flow in a millimeter channel. A transparent acrylic channel (heat exchanger form), high-speed camera (2000 fps at 1024 x 1024 pixels), and halogen lamp (backup light) were used as the visualization system. The channel's depth is 2 mm, width is 30 mm, and length is 400 mm. In preparation for commercial use, two types of channels were experimented on: a fins type and a normal slit type (without fins). The fins are circular cylindrical obstacles (diameter is 5 mm) to promote heat transfer, set in a triangular array (distance between each center point is 10 mm). Especially in this work, boiling flow and heat transfer promotion in the millimeter channel heat exchanger with fins was evaluated using a high-speed camera.

Satoshi Watanabe
University of Tokyo

Date submitted: 09 Aug 2005 Electronic form version 1.4