Abstract Submitted
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Acoustically enhanced boiling heat transfer on a heated surface containing open microchannels[1] THOMAS R. BOZIUK, MARC K. SMITH, ARI GLEZER, Georgia Institute of Technology — Acoustic actuation is used to enhance boiling heat transfer on a submerged heated surface containing an array of open microchannels by controlling the formation and evolution of vapor bubbles and inhibiting the instability that leads to film boiling at the critical heat flux. The effect of actuation at millimeter and micrometer scales is investigated with emphasis on the behavior of bubble nucleation, growth, contact-line motion, condensation, and detachment. The results show that microchannels control the location of boiling and reduce the mean surface superheat. In addition, acoustic actuation increases the heat flux at a given surface temperature and leads to a significant increase in the critical heat flux, a reduction of the vapor mass above the surface, and the breakup of low-frequency vapor slug formation.

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