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Development of a Compact Spray Cooling Module for Thermal Control of High Power Electronics

S. C. Yao
Professor, Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA

Cristina Amon
Director ICES and Professor, Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA

Industry Participant
Jere Hohmann
President, Spectrum Devices Corp., Doylestown, PA

Abstract

Spray cooling for electronic systems was first proposed at CMU in 1988 and has been demonstrated in various medium size applications as well as the newest Cray Supercomputer. In this project, a compact spray cooling module will be designed and tested for application in smaller electronic systems. In small systems, combined capillary pumping and piezeo-electric spray generation are utilized to replace the present fluid pumps and the complex spray generators. Together with a robust vapor transport and condensation design, this cooling module will be highly compact, energy efficient, reliable, low cost and most importantly operational independent of gravity orientations.

The success of this project will benefit PA companies by providing leading edge expertise and technology transfer in the area of high power electronics cooling and by addressing commercial challenges posed by thermal management of increasingly smaller electronic devices.