Local Two-Phase Heat Transfer from Confined and Submerged Impinging Jets

Faculty: S. V. Garimella  
Student: Matthew J. Rau

Objective

Characterize the spatially non-uniform cooling of two-phase impinging jets and jet arrays as a function of applied heat flux

- Improve orifice design tools for two-phase jet impingement cooling systems
- Highlights the trade-off between temperature uniformity and overall heat dissipation in two-phase jet orifice design

Approach

- Experimentally map local temperatures in single- and two-phase operation
- Compare pressure drop and local and average heat transfer coefficients of three orifice designs

Impact

Spatial temperature maps in single-phase (left) and two-phase (right) operation illustrate that the large single jet results in the highest degree of temperature uniformity

Pressure drop remains constant regardless of applied heat flux

Selected Publications