



International Conference on Micro Nano Fluidics (ICOM 2025)



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Tentative topic of the invited talk

Intermittent Spray Cooling: Prediction and Design

Abstract of the invited talk

In intermittent spray cooling, two extra parameters must be defined compared to continuous spray cooling the duty cycle, which specifies the percentage of time the spray is active, and the cycle frequency, which is the time between successive spray events. Together with the mass flux of drops at the substrate to be cooled, these three parameters determine what the steady state average temperature of the substrate will be and the magnitude of substrate temperature fluctuations between the on and off phases of the spray. In the present study, an analytic procedure will be derived to allow a suitable choice of these three parameters for a given cooling problem. The cooling problem is defined by knowing the input heat flux, the thermal properties of the substrate, and the size and velocity distributions of the spray drops immediately before impact. This analytical procedure is then validated using existing experimental data. Furthermore, the performance of an intermittent spray cooling system operated under off-design conditions will be evaluated.