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Funding Source: Other

Comparing impingement boiling vs. pool boiling to improve technological insight into liquid cooling in electronics

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With the field of technology advancing at a rapid pace so must the technology behind cooling these electronic parts. My research compares two completely different of cooling operations and compares many different fluids in each method. This research will help lead the electronics industry into the future of liquid cooling. The first method is impingement boiling where jets of fluid spray a heated copper coupon and as the fluid rapidly boils it removes large amounts of heat. Jet arrays will be tested for one jet, four jets, and nine jets. Also we will experiment with different sorts of surface finishes on the heated copper coupon to see how this affects heat transfer. The three fluids that will be tested in this experiment are Water, Ethanol, and HFE7000. With these fluid's contrasting properties we should obtain great insight into what properties are most desired for this form of cooling. The second method of removing heat will be by pool boiling. For these tests will have a similar copper coupon, but in this case the fluid is allowed to gather in a pool completely submersing the copper coupon. We will be testing the fluids listed above plus some additional nanofluids. This is a very simple form of boiling that yields great amounts of heat transfer. Pool boiling as well as impingement boiling both have a very positive outlook for the future of liquid cooling and I hope to offer more insight though my research.