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**OIS 09 Submission 132**

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**Paper 132 (abstract only)**

**Title:** Micro-scale heat exchanger for microchip cooling using EOF  
Microheat exchanger

**Keywords:** Electro Osmotic Flow (EOF)  
Microchip cooling

**Abstract:** Abstract  
Heat generation rates in excess of 250 W/cm<sup>2</sup> have been projected for some of the next-generation intensive computing devices (Vishal Singhal, et al (2004) Microscale pumping technologies for microchannel cooling systems, Applied Mechanics). These values of heat flux can't be handled by the conventional heat removal system such as the forced convective heat transfer by air. Due to this increasing heat generation values a new forced convection using liquids flowing through micro-channels is being used. A micro-scale heat exchanger was designed as two reservoirs connected by a set of micro-channels. This structure was etched on a 2", <110> oriented silicon substrate. Photolithography was used followed by KOH etching. Electro Osmotic Flow (EOF) is used to drive the buffer solution through channels, and the flow rate is controlled by the applied voltage. By applying heat to the bottom of the substrate and starting the buffer flow, the substrate temperature was measured along with the temperature of the buffer at the inlet and outlet. Various parameters are varied such as the heater power, buffer flow rate and channel width. Also, Substrate temperature was measured at different powers and flow rate and data was plotted.

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