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A Mighty Wind's a Blowin' at P

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Researchers at Purdue University have developed a new method of semiconductor cooling that could improve the cooling rate inside computers by as much as 250 percent.

The method, called Ionic Wind technology, almost sounds like a Sharper Image commercial. But the Ionic Wind won't clean the air; it will be integrated onto fan-cooled heat sinks.

"The current version of this technology is targeted at enhancing the performance of existing fan-cooled applications," said Suresh V. Garimella, director of the Cooling Technologies Research Center at Purdue's School of Mechanical Engineering. "The idea is to locally enhance cooling already obtained with fans."

The researchers used a mock computer chip, rather than something from Intel or AMD in their tests, but they say the cooling system will work on any CPU. One of the co-authors of the research paper discussing the work is Intel research engineer Rajiv Mongia.

Ionic Wind works by generating ions between two oppositely charged electrodes. Electrons colliding with air molecules create positively charged ions that are then blown toward the negatively charged electrode, producing the "ionic wind."

This wind increases the airflow over the surface of the chip, cooling it down. In one experiment, they cooled a chip from 140 degrees Fahrenheit to about 95 Fahrenheit.

"Our technology will fit in electronics of any form factor, and is particularly well-suited to smartphone-type applications. The ionic wind engine actually does not add additional volume requirements," said Garimella. "The electrodes we use are flush with the surface to be cooled."

Bob Merritt, a vice president with Semico Research, said the current solutions aren't going to work in the long term and some kind of new cooling is going to be needed. "We can't keep using more and more fans," he told *InternetNews.com*.

"The semiconductor approach has been to find lower power or cell structures to run at lower voltage levels, but that's a short-term solution. The bigger solution has to be

along the lines of more heat dissipation," said Merritt.

Ionic Wind has a much lower power draw than traditional fans, said Garimella, so its impact should be minimal. "Once we demonstrate that this cooling can be achieved at low voltages, we anticipate the technology being very attractive for commercialization," he said.

Heat is a bad enough problem now, said Merritt. It will only get worse.

"Where is the industry going to be in 10 more years? We could be doing four to eight times the processing in the same space, with dense packing of components. At the end of the day we're getting denser, so if these guys have a solution I'd be happy to take a look at it," he said.