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Tiny refrigerator to cool future computers

ANI
Monday, June 23, 2008, 15:48 [IST] AAA

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An IIT-Madras alumnus, currently associated with Purdue University, has revealed that he and his colleagues are working on a miniature refrigeration system that will be small enough to be used inside laptops and personal computers.

Futuristics

Suresh Garimella, Director of the Cooling Technologies Research Center based at Purdue, says that such a cooling **technology** may help boost performance of the machines while shrinking their sizes.

As compared to the existing cooling systems that use a fan to prevent computer chips from overheating, he says, the miniature refrigeration would dramatically increase how much heat could be removed. The researcher has revealed that his research focuses on learning how to design miniature components called compressors and evaporators, which are critical for **refrigeration systems**.

His team has already developed an analytical model for designing tiny compressors that pump refrigerants using penny-size diaphragms, and validated it with experimental data.

New types of cooling systems will be needed for future computer chips.

Suresh has revealed that the elastic membranes are made of ultra-thin sheets of a plastic called polyimide, and coated with an electrically conducting metallic layer that allows the diaphragm to be moved back and forth to produce a pumping action using electrical charges, or "electrostatic diaphragm compression".

He also says that another related research has made his team the first to precisely measure how a **refrigerant** boils and vaporizes inside tiny "microchannels" in an evaporator, and to determine how to vary this boiling rate for maximum chip cooling.

"We feel we have a very good handle on this technology now, but there still are difficulties in implementing it in practical applications. One challenge is that it's difficult to make a compressor really small that runs efficiently and reliably," said Garimella, who led the research with Eckhard Groll, a professor of mechanical engineering.

The researchers say that new types of cooling systems will be needed for future computer chips that will likely generate 10 times more heat than today's microprocessors.

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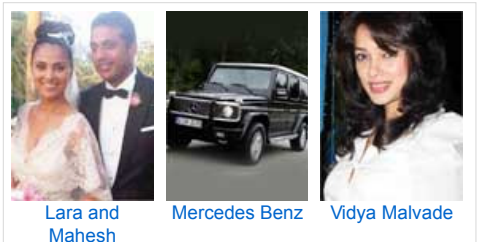
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