Tiny refrigerators to cool future computers

Laptops and personal computers of the future will be cooled by tiny fridges sitting snugly inside them, according to an Indian American computer scientist.

Unlike conventional fan-based systems, these miniatures would ensure the removal of a greater volume of heat and also improve the performance of the machines, said Indian American Suresh Garimella, of Purdue University, in West Lafayette, Indiana.

New types of cooling systems will be needed for future chips that are expected to generate 10 times more heat than microprocessors today, especially in small "hot spots", said Garimella, a product of the Indian Institute of Technology (IIT), Madras.

Garimella and his team have already developed an analytical model for designing tiny compressors that pump refrigerants using penny-size diaphragms.

They have also validated the model with experimental data.

"We feel we have a very good handle on this technology now, but there still are difficulties in implementing it in practical applications," said Garimella, director of Purdue's Cooling Technologies Research Centre.

"One challenge is that it's difficult to make a compressor really small that runs efficiently and reliably."

"The best that all other cooling methods can achieve is to cool the chip down to ambient temperature, whereas refrigeration allows you to cool below surrounding temperatures," he said.

The ability to cool below ambient temperature could result in smaller, more powerful computers and also could improve reliability by reducing long-term damage to chips caused by heating.

The findings if the team, led by Garimella, will be detailed in two papers slated to be presented at the 12th International Refrigeration and Air Conditioning Conference in July.

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