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# **UCI: Nanotubes faster than copper in chips**

Carbon nanotubes can route electrical signals on a computer chip faster than traditional copper or aluminum wires, at speeds of up to 10 GHz, according to experiments reported Thursday by scientists at the University of California, Irvine.

The breakthrough could lead to faster and more efficient computers, and improved wireless network and cellular phone systems, the university says.

"Our prior research showed that nanotube transistors can operate at extremely high frequencies, but the connections between the transistors were made out of somewhat slower copper, thus forming a bottleneck for the electrical signals," says Peter Burke, assistant professor of electrical engineering and computer science, and one of the researchers who developed the technology. "In this technology we show that nanotubes can also quickly route electronic signals from one transistor to another, thus removing the bottleneck."

Most of the layers of a modern semiconductor chip are dedicated to interconnect wiring, making the material used, and its speed, extremely important. The semiconductor industry recently shifted from using aluminum to copper as interconnects because copper carries electrical signals faster than aluminum. Based on Mr. Burke's work, it is now clear that changing the industry from copper to nanotubes would provide an even larger performance advantage in terms of speed, UC Irvine says.

Before such a shift could occur, however, nanotube technology would need to be economical to manufacture and require precise assembly, a project Mr. Burke is currently working on.

Electrical signals are routed at high speed through virtually all modern electronic systems and also through the airwaves in all modern wireless systems.

A nanotube is commonly made from carbon and consists of a graphite sheet seamlessly wrapped into a cylinder only a few nanometers wide. A nanometer is one billionth of a meter, about the size of 10 atoms strung together.