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Researchers Say New Chip Breaks Speed Record

By LAURIE J. FLYNN

Researchers at I.B.M. and the Georgia Institute of Technology are set to announce today that they have broken the speed record for silicon-based chips with a semiconductor that operates 250 times faster than chips commonly used today.

The achievement is a major step in the evolution of computer semiconductor technology that could eventually lead to faster networks and more powerful electronics at lower prices, said Bernard Meyerson, vice president and chief technologist in I.B.M.'s systems and technology group. He said developments like this one typically found their way into commercial products in 12 to 24 months.

The researchers, using a cryogenic test station, achieved the speed milestone by "freezing" the chip to 451 degrees below zero Fahrenheit, using liquid helium. That temperature, normally found only in outer

space, is just nine degrees above absolute zero, or the temperature at which all movement is thought to cease.

At 500 gigahertz, the technology is 250 times faster than chips in today's cellphones, which operate at 2 gigahertz. At room temperature, the chips operate at 350 gigahertz, far faster than other chips in commercial use today.

Mr. Meyerson compared the achievement to the development of the chips used in Wi-Fi networks. It was not until the semiconductor technology used in those networks was produced with silicon that wireless networking became affordable for consumer applications.

Dan Olds, a principal at the Gabriel Consulting Group, a technology consulting firm in Portland, Ore., said the development was significant because it showed that the chip industry had not yet reached its upper limits. "There's been talk that we've started to hit the physical limitations

of chip performance," he said. "The news here is that we're not coming anywhere near the end in what processors are capable of."

Mr. Olds cautioned, however, that the technology was far from finding its way into commercial products any time soon, considering the performance leap it represents. Today's performance-hungry computer buyers, for example, are buying machines operating at about three gigahertz, he said.

John D. Cressler, a professor in Georgia Tech's School of Electrical and Computer Engineering and a researcher at the Georgia Electronic Design Center, said the work "redefines the upper bounds of what is possible" using silicon-germanium.

The research group included students from Georgia Tech and Korea University in South Korea, and researchers from I.B.M. Microelectronics. The results will be reported in the July issue of the technical journal IEEE Electron Device Letters.