

THE WALL STREET JOURNAL.

© 2006 Dow Jones & Company. All Rights Reserved

TUESDAY, JUNE 20, 2006 - VOL. CCXLVII NO. 143 - ★★★ \$1.00

IBM, Georgia Tech Unveil 500-Gigahertz Chips

By **WILLIAM M. BULKELEY**

Semiconductor chips that run at 500 billion cycles a second—more than 100 times faster than those in speedy personal computers—were demonstrated by researchers at **International Business Machines Corp.** and Georgia Institute of Technology.

The chips are the fastest yet demonstrated that can be built with typical semiconductor technology and could pave the way for advances in fields including wireless communication, remote detection and automotive devices.

One of the barriers in boosting semiconductor speed and power is the increased heat generated by the electricity flowing through chips packed with circuitry. The IBM-Georgia Institute of Technology feat was achieved by chilling the chips to 451 degrees below zero Fahrenheit, a few de-

grees above absolute zero, the scientific term for the coldest possible temperature, which is 459.67 below.

Instead of relying on pure silicon, the foundation material of modern semiconductors, the chips in the demonstration were made of silicon and germanium, using an increasingly popular combination of elements to improve speed. Even at room temperature, the chips can run as fast as 350 billion cycles, or gigahertz. In contrast, silicon-germanium chips in the current generation of cellphones run at about two gigahertz.

Georgia Tech's John Cressler, a professor of electrical and computer engineering who tested the chips in his school's NASA-funded cryogenic facilities, said "this shows where the future of silicon-based semiconductors is going." Because they can be built using typical semicon-

ductor-manufacturing technology, they are cheaper than chips using exotic materials such as gallium arsenide.

Bernie Myerson, chief technology officer of IBM's systems-and-technology group, said room-temperature versions of the chips are likely to start enabling high-speed wireless networks for homes and offices within two years or so.

Mr. Myerson said that 60-gigahertz wireless networks would be able to transmit and receive high-definition television, movies on demand and interactive games while eliminating the need for costly chips for compressing and decompressing the data. The technology is likely to become so cheap that it could be used to equip all cars with cruise-control radars that lock onto a car in front and maintain a constant distance from it, preventing rear-end collisions, he said.