Georgia Tech researchers propose terabit level graphene antenna

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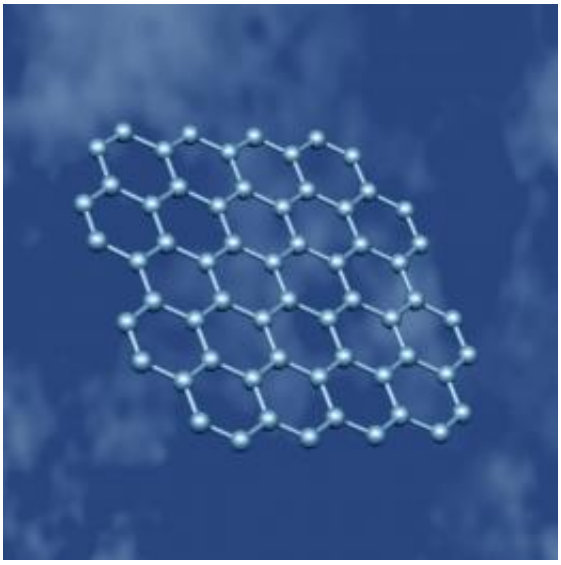

Artistic impression of graphene molecules. Credit: University of Manchester

(Phys.org) —Researchers at Georgia Institute of Technology, led by lab director Ian Akyildiz, are proposing that a graphene antenna could be built that would be capable of transferring data at the 10 to 100 terabit level. In a paper to be published in IEEE's *Journal of Selected Areas in Communication*, the team will outline how a nano-sized antenna made of graphene could be constructed that would take advantage of the materials' superfast electron transfer properties.

Graphene has been making headlines over the past few years as

researchers discover new ways to make use of its unique properties—its one layer of carbon atoms arranged in a honeycomb structure offer almost no resistance to electrons which allows for much faster movement of electricity than metal or silicon. In this new research, the team believes it would be possible to take advantage of electron oscillations (plasmonic waves) that occur on its surface, at the terahertz range, to send and receive data. The antenna the researchers envision would be made of strips of graphene approximately 10 to 100 nanometers wide and approximately one micrometer in length.

Such an antenna, the researchers suggest, could transmit 10 terabits of data per second between two devices situated approximately one meter apart. Moving the two devices closer, to just centimeters apart, could bump the rate to 100 terabits of data per second. That would be equivalent to moving all of the data on a full large capacity hard drive to another in about the time it takes to swallow a mouthful of coffee.

Of course there are more factors involved in moving data than just the bus on which it travels—to copy several high definition movies between two cell phones for example, each equipped with a graphene antenna, would require new electronics to retrieve and send the data on one end and process and store it on the other, in a way that could keep up with such transfer speeds. There is also the problem of connecting the graphene sheets that make up the antenna to other electronic components—a stumbling point for other graphene applications as well. Also if the researchers do manage to build a working graphene antenna, there would still be the problem of how to manufacture it in large quantities.

More information: www.ece.gatech.edu/research/la … s/bwn/IFA/index.html
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