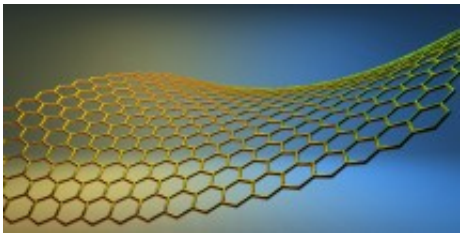
Miracle material graphene could deliver Internet one hundred times faster

July 12 2013



Researchers look at new ways to use graphene in telecommunications.

(Phys.org) —The use of graphene in telecommunications could dramatically accelerate internet speeds by up to a hundred times, according to new research by scientists in our Department of Physics.

In a paper published in *Physical Review Letters*, researchers from the Centre for Graphene Science at the Universities of Bath and Exeter have demonstrated for the first time incredibly short optical response rates using graphene, which could pave the way for a revolution in telecommunications.

Every day large amounts of information is transmitted and processed through optoelectronic devices such as optical fibres, photodetectors and lasers. Signals are sent by photons at infrared wavelengths and processed using optical switches, which convert signals into a series of light pulses.

Ordinarily optical switches respond at rate of a few picoseconds – around a trillionth of a second. Through this study physicists have observed the response rate of an optical switch using 'few layer graphene' to be around one hundred femtoseconds – nearly a hundred times quicker than current materials.

Graphene is just one atom thick, but remarkably strong. Scientists have suggested that it would take an elephant, balanced on a pencil to break through a single sheet. Already dubbed a miracle material due to its strength, lightness, flexibility, conductivity and low cost, it could now enter the market to dramatically improve telecommunications.

Commenting on the report's main findings, lead researcher Dr Enrico Da Como said: "We've seen an ultrafast optical response rate, using 'few-layer graphene', which has exciting applications for the development of high speed optoelectronic components based on graphene. This fast response is in the infrared part of the electromagnetic spectrum, where many applications in telecommunications, security and also medicine are currently developing and affecting our society."

Co-Director of the Centre for Graphene Science at Bath, Professor Simon Bending added: "The more we find out about graphene the more remarkable its properties seem to be. This research shows that it also has unique optical properties which could find important new applications."

In the long term this research could also lead to the development of quantum cascade lasers based on graphene. Quantum cascade lasers are semiconductor lasers used in pollution monitoring, security and spectroscopy. Few-layer graphene could emerge as a unique platform for this interesting application.

More information: prl.aps.org/abstract/PRL/v110/i21/e217406

PHYS.ORG

Provided by University of Bath

Citation: Miracle material graphene could deliver Internet one hundred times faster (2013, July 12) retrieved 22 May 2024 from https://phys.org/news/2013-07-miracle-material-graphene-internet-faster.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.