

Professor scoops top prize for 2D atomic crystals discovery

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Professor Andre Geim of the School of Physics and Astronomy has been awarded the 2007 Mott Medal and Prize by the Institute of Physics for his ground-breaking work. The research of Professor Geim, Dr Kostya Novoselov and colleagues at the University led to the discovery of a new class of materials called two-dimensional atomic crystals back in 2004.

But it is graphene that has caused a real stir in the world of science.

Graphene is a single layer of carbon atoms densely packed in a honeycomb crystal lattice. The material is made from splitting graphite apart into individual atomic planes, through a process similar to tracing with a pencil. The resulting atomic sheet is unexpectedly stable, highly flexible and strong, and very conductive.

One of many unique properties of graphene is that its electrons mimic particles moving with the speed of light, which presents an easy way for scientists to study relativistic phenomena.

In November 2005, a team of British, Russian and Dutch scientists led by Professor Geim, used graphene to test Einstein's theory of relativity in a table-top experiment. Until then, it was only possible to test the famous theory by building expensive machinery or by studying stars in distant galaxies.

The team's discovery has the potential to speed up future discoveries and save billions of pounds, now that tests can be set up using graphene and

relatively inexpensive laboratory equipment.

Professor Geim and his team have also found that graphene exhibits a remarkable quality, which means that electrons can travel without any scattering over submicron distances. This is important for making very fast switching transistors.

In the quest to make the computer chip more powerful and faster, engineers are striving to produce smaller transistors, shortening the paths electrons have to travel to switch the devices on and off.

Ultimately, scientists envisage transistors made from a single molecule, and Professor Geim's work has brought that vision ever nearer. In the future, it could lead to a computer being carved entirely out of a single sheet of graphene.

"It is certainly nice and somewhat unexpected to be acknowledged at such an early stage," said Professor Geim. "Although it was found only two years ago, graphene has proved itself as a truly remarkable material, with a wealth of new physics coming out.

"It is too early to speak about real applications. However, all the indications are that graphene will be not just another new material but will find a multitude of applications so that everyone might eventually be influenced by this discovery."

Professor John Durell, Head of the School of Physics and Astronomy said: "We are delighted that the outstanding research work of Andre Geim and his team has been recognised by the award of the Mott Medal and Prize by the Institute of Physics.

"The discovery of graphene has led to the creation of a new and exciting 'laboratory' for the study of fundamental science. Future development of

production techniques could lead to applications with the potential to revolutionise electronic devices."

The Institute of Physics said its 2007 awards honour physicists who have made remarkable contributions to science.

Source: University of Manchester

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