Nanofabrication to lead to Quantum Computer

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The team of scientists headed by professor Jeremy Levy at Pitts University has developed nanofabrication tools. The team has an electron beam lithography and nano engineering workstation - with an electron beam capable of adding and taking away from materials to create incredibly small objects. This according to Prof. Levy could lead to create a quantum computer, and it could break all codes on the Internet.

Nano-fabrication is a technology that has the ability to create and destroy on a very small scale. Pitt now has a Raith electron beam lithography and Nan engineering workstation - with an electron beam capable of adding and taking away from materials to create incredibly small objects.

The device uses five small capillaries. These are hollow injection needles. They are used to add specific gases and materials to a small surface. Then a small beam of electrons acts to help these gases interact with the object to shape it. A nanometer is one billionth of a meter, 1,000 nanometers is a micron and 100 microns is about the width of a single strand of hair. This implies that by its inherent nature the technology is precise.

The electron beam can be focused to a diameter of two nanometers, or about twice the distance between two atoms in a solid object. Levy said that the possibilities of this technology include building incredibly small conductors; since the workstation can “etch,” wires 10 nanometers in diameter onto a surface.

A unique feature of this instrument is an electron beam-induced deposition and etching capability that allows metals, insulators, and semiconductors to be added or removed, using the electrons as a nanocatalyst.

Another important aspect is that variety of material can be used to etch. Levy states:" While you're exposing the material to the electrons; you can put in different materials, like platinum or tungsten. Even water can be used to etch materials".

University of Pittsburgh thus becomes the only institution in the United States and the second in the world to have a unique nanofabrication capability. Levy is excited as his team and he says:" What is exciting is that researchers have come to the initial training session with some precursory ideas about what they want to do, but after seeing all of the capabilities, their outlooks change; completely new approaches now seem possible". This change of outlook is most important.

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