



## Article Side

Norton Medical and Scientific Research & Biotechnology: Transistors the Size of One Atom Created by [Norton Med](#)

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A transistor made up of only one atom has been made, according to a report published this month in Nature Nanotechnology. Physicists have built a working transistor using just one phosphorus atom accurately placed in a silicon crystal.

A group of researchers from Australia, US and South Korea have cooperated in creating a single-atom transistor from a single phosphorus atom in silicon.

According to researchers of Purdue University who already did digital simulations of transistors, this technique that utilizes liquid nitrogen-cooled device can only be possible at very low temperatures of negative 391 F.

It is made possible through manipulating single atoms in a scanning tunneling microscope. In the past, silicon's atomic structure has made it hard to engineer circuits using STMs in an atomic scale. What they used is a combination of etching and STM to make a transistor with an accurate location on a silicon surface.

A transistor is the device that can switch and/or amplify an electronic signal, provided that it is connected to an external circuit by at least 3 terminals. Transistors are made of semiconductor materials and are basically crucial in today's lifestyle for they are part of almost every electronic device we have like mobile phones and computers.

Ordinary transistor dimensions are becoming smaller in time owing to the improvements in nanotechnology and materials used. Reducing the size of transistors is a big deal for every device that depends on the number of transistors in them for their efficiency.

The miniaturization was previously described in 1965 by the co-founder of Intel, Gordon Moore. He observed the trend of transistors at that time and formulated what is known today as Moore's Law. It states that the number of transistors in one chip of a computer will double every two years (18-24 months). However, there is a warning that this cannot go on forever and a limit will eventually be reached when the smallest possible transistor is made, which according to Moore's Law should be around 2020. Apparently, we have reached the limit far too early as it is not possible to reduce a transistor already in the size of a single atom.

And just to make sure the idea of how small we are talking about here sinks in, think one ten-billionth of a meter -- that's 100 picometers, the diameter of 1 (one) phosphorus atom.

Their group has proved that it's possible to put a phosphorus atom in silicon with atomic precision.

The team of developers is hoping that their method of manipulation in an atomic scale can be used as founding blocks for quantum computers or devices that use quantum mechanics to represent digital data. Though even with this breakthrough, there is fair warning that quantum computers might not be possible to build.

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