

Re: In quantum physics breakthrough, strange computer is on and off

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- *From:* Jan Panteltje <[pNaonStpealmtje@xxxxxxxxx](mailto:pNaonStpealmtje@xxxxxxxxx)>
  - *Date:* Fri, 10 Mar 2006 15:10:44 GMT
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On a sunny day (Fri, 10 Mar 2006 14:48:59 GMT) it happened Sam Wormley <[swormley1@xxxxxxxxx](mailto:swormley1@xxxxxxxxx)> wrote in <[ulgOf.16064\\$oS.L.12012@attbi\\_s71](mailto:ulgOf.16064$oS.L.12012@attbi_s71)>:

In quantum physics breakthrough, strange computer is on and off  
<http://www.kansascity.com/mld/kansascity/news/nation/13946424.htm>

BY JEREMY MANIER  
Chicago Tribune

CHICAGO – In the bizarre realm of quantum mechanics – the physics theory that stumped even Albert Einstein – tiny things like electrons and packets of light often seem to be in two places at once, in total violation of common sense.

Now a University of Illinois physics team has taken that principle and built something harder to fathom: a quantum-based computer that can be awake and asleep at the same time, and spits out answers even if its program is never triggered.

It's plenty strange, but some experts say such real-world spinoffs of eerie quantum effects are growing so common that it's our understanding of "strange" that needs to change.

"This is the way nature is," said Charles Bennett, an IBM researcher who dreamed up some of the new uses of quantum physics. "We should be learning how to get used to that."

Quantum mechanics is the theory physicists use to understand events at the atomic level, which works far differently than the large-scale world that people inhabit. The theory states that it's impossible to gain complete knowledge about any subatomic particle, and its location and other traits often exist only as probabilities.

That maddening, fuzzy quality is fueling creative ideas about how to put quantum effects to work.

The University of Illinois experiment, published Thursday in the

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journal Nature, could help refine the young field of quantum computing. In theory, computers based on quantum effects could race through calculations that would take an ordinary computer billions of years to complete. Applications of such computers could include precise simulations of how proteins work in the human body.

Recent research also has raised the prospect of unbreakable quantum codes, a commercial opportunity that some companies already are vying to exploit. Bennett and others have pioneered a form of "quantum teleportation" that can replicate the characteristics of light particles more than a mile away – though nobody expects to be able to beam people around.

The not-quite-technical term many physicists use for such effects is "quantum weirdness." Although quantum theory has proved one of the most successful and accurate ideas in science since Max Planck laid its foundations a century ago, most great physicists have pronounced the theory nearly impossible to reconcile with common sense. Einstein could not accept the theory's glorification of probability, complaining, "God does not play dice with the universe."

University of Illinois physics professor Paul Kwiat, co-author of the new quantum computing study, said one of his favorite quotes on the subject is by Nobel laureate Murray Gell-Mann, who once said: "We know how to use (quantum mechanics) and how to apply it to problems; and so we have learned to live with the fact that nobody can understand it."

Kwiat said he and his team don't need to understand what quantum theory ultimately means for philosophical notions of reality. But they do know that quantum effects allowed them to dream up one really weird computer.

Like a frantic one-man band, a quantum computer gets its unique power by trying to do many things at the same time.

Such devices are far different from the digital computers everyone uses, which can process just one "bit" of electronic information at a time, in a stately procession of 0s and 1s.

One bitters existed, indeed, these day a few \$ will buy an AMD 64 bitter. I have some algo here that does math in parallel on the registers in 64 bits, so uses 64 bits registers as 64 one bitters. It has an incredible speed advantage actually. If you, as mathematician, want to see that source (no it was not done by me), I can let you have it, and its explanation. It is in fact used to decode a cypher.

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The rest also sucks in that article.

Regards

Jan

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