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Article #2

Quantum Computers

This article was published in 2011 and there have been many advances in quantum computers since then. Quantum computers are computers that use the laws of quantum mechanics to solve complex problems many times quicker than regular computers can.

Serge Haroche of the Ecole Normale Superieure and College de France in Paris have created a real time feedback mechanism for a quantum computer. Feedback loops and other control mechanisms are very important to the operation of conventional computers. Matteo Mariantoni and John Martinis of UCSB created a quantum central processing unit with a memory. They made the first quantum computer that uses the regular von Neumann processor memory architecture.

These two groups of people made some huge advancements in quantum computer. Many very influential people have praised them for there work. Dick Slusher, the director of the Quantum Institute at the Georgia Institute of Technology is one of the many experts that have been praising the groups. Disk Slusher has said that “for quantum computing to be fault tolerant—a condition required to scale up to true applications like factoring useful coding keys—the error levels must be much lower than achieved so far.”

Quantum computers have made some very big advances in the past couple of years. One of which is the progress towards silicon devices. Right now, quantum computers do not compare to the conventional computers. One of the problems is that quantum computers are very fragile. They will actually start to break down and it can happen quickly.

Scientists keep trying to make quantum computers work. By trying to make them work they are also trying to add some of the same engineering concepts from the conventional computers into them. Quantum computers have never even compared to conventional computers even when using some of their own concepts until the recent discoveries by the scientists I mentioned earlier.

In order to have quantum feedback someone needs to be able to observe the system by performing so called weak measurements. Haroche has found a way to observe the system by using a small collection of atoms as a quantum sensor. In order to find a shift in there phase they send the atoms through a microwave cavity that contains the qubits and photons. It does this by performing a weak measurement that doesn’t lead to the collapse of the lights nature.