Quantum light beams good for fast technology

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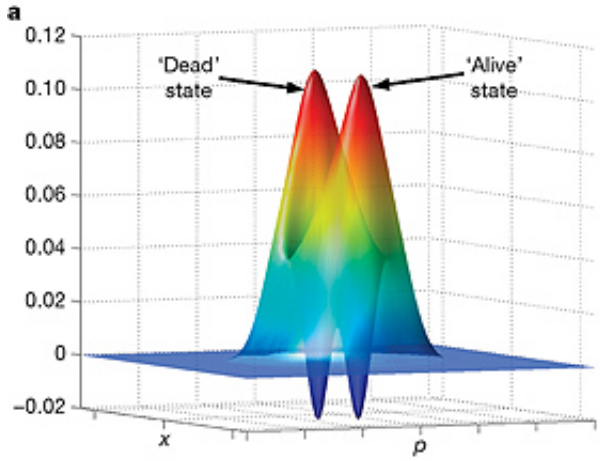

Dr Jeong's test results that prove quantum properties. Credit: UQ

Australian and French scientists have made another breakthrough in the technology that will drive next generation computers and teleportation. The researchers have successfully superposed light beams, which produces a state that appears to be both on and off at once.

Light beams that are simultaneously on and off are vital for the next-generation super computers which should be faster than current computers based on bits, that are either on or off.

Previously, only smaller light particles had been superposed and the group has also proved a quantum physics theory known as Schrödinger's

cat.

This theory, named after an Austrian physicist Erwin Schrödinger, proposed that a large object such as a cat could be simultaneously alive and dead.

Researchers from The University of Queensland and University of Paris South have published the latest breakthrough in the international journal *Nature*.

UQ Centre for Quantum Computer Technology researcher Dr Hyunseok Jeong devised the scheme to generate and superpose the beams which was tested and proved by his French collaborators.

Dr Jeong said his group used special lasers, crystals, photon detectors, half-mirrors and other optical devices to generate and measure the superposition of light beams.

“It has been known to be extremely hard to generate Schrödinger cat states, particularly with traveling light,” Dr Jeong said.

“Even though one could generate such Schrodinger cat states, it would be extremely hard to observe them because in a very short time, they would be reduced to either alive or dead states.”

He said his group's research findings would help speed up the development of quantum information technologies such as quantum computers, quantum cryptography and quantum teleportation.

“Using Schrödinger cat states, quantum teleportation may be performed with nearly 100 percent success probability.”

Link: www.nature.com/nature/journal/ … ull/nature06054.html

Source: University of Queensland