Tokyo pair make quantum computing leap

JIJI, BLOOMBERG

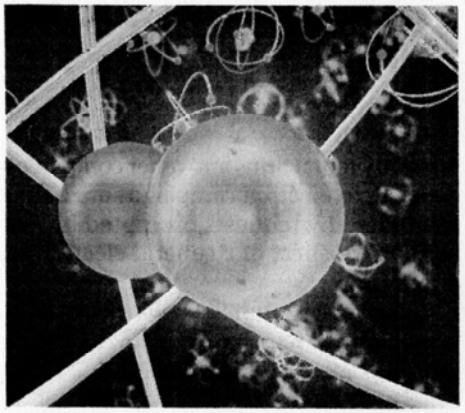
Japanese scientists have invented an approach to quantum computing that renders a far larger number of calculations more efficiently than existing quantum computers.

Under the new method, many pulses of light, each carrying information, are allowed to go around in a loop circuit indefinitely. The circuit performs multiple tasks, switching from one task to another rapidly through instant manipulations of the pulses.

The invention was announced in an article by University of Tokyo professor Akira Furusawa and assistant professor Shuntaro Takeda that was posted on an electronic version of the U.S. journal Physical Review Letters.

"We'll start work to develop the hardware, now that we've resolved all problems except how to make a scheme that automatically corrects a calculation error," Furusawa said.

The potential of quantum computing is enormous. Tapping into the weird way nature works could potentially speed up computing so some types of problems that classical computers cannot handle could finally yield solutions.



Physicists are working to harness the properties of atomic particles to build faster computers based on light transmissions. ISTOCK

Eventually, researchers say, quantum machines could solve problems that would take an ordinary computer years, including how to create new and lifesaving medicines and unraveling the mysteries of deep space.

Many governments are funding research toward developing quantum computers for civilian, business and national security purposes, such as unbreakable encryption.

In 2013, Furusawa's team developed a basic system for optical quantum computing. The system requires more than 500 mirrors and lenses and occupies space 4.2 meters long and 1.5 meters wide, while it can handle only one pulse.

To boost the capacities, many units need to be connected. But that is difficult, given the size and complicated structure of the system.

In the new approach, a single circuit plays the role of many such systems.

In other types of quantum computers, including those using superconducting circuits, some are capable of handling up to dozens of quantum bits, or qubits, the basic unit of information in quantum computing.

Furusawa's new approach will allow a single circuit to process more than 1 million qubits theoretically, his team said in a press release, calling it an "ultimate" quantum computing method.

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UNIVERSITY OF TOKYO PROFESSOR AKIRA FURUSAWA

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