*** 北米連携センター定期報告***

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●グーグル、UCSBの量子コンピューティング・プロジェクトを支援へ

【Wall Street Journal Blog, 2014/09/02】

グーグルは 2 日、新しい量子情報プロセッサを開発する UCSB のプロジェクトを支援すると発表。これに伴い、1980 年代から量子コンピューティングの研究に携わっているジョン・マルティネス物理学部教授など、およそ 20 名から成る研究チームの一部メンバーが UCSB とグーグルの両方に在籍することになる。

高速な情報処理を可能にすると期待される量子コンピュータは、現時点で商用化されているのは D-ウェーブ・システムズの製品のみ。これまで販売された 2 台の内、1 台はロッキード・マーチンが購入。もう 1 台はグーグルが NASA とともに調達したもので、現在グーグル本社の近くに設置されている。

グーグルが量子コンピューティング・プロジェクトに関わるのはこれに次いで、今回が 2 度目となる。

D-ウェーブの製品が実際に量子コンピュータの定義を満たすのかどうかについては相反する研究論文が発表されているが、グーグルは、今後も D-ウェーブ、NASA 量子人工知能研究所と協力を続けていく方針だという。

（参考）本件報道資料

Energy Races to Build Quantum Encryption – for Citizens

Google Backs Second Quantum Computing Effort

A Quantum QTM -0.40% qubit architecture prototype developed at the University of California at Santa Barbara

Erik Lucero/University of California Santa Barbara

Scientists can't seem to agree on what a quantum computer is. But the uncertainty hasn't deterred Google GOOGL +0.81% from backing a second major effort in the field.

The Internet search giant on Tuesday said it is backing a project to design and build "new quantum information processors" with researchers at the University of California at Santa Barbara.

John Martinis, a physics professor there who has worked on quantum computing since the 1980s, said he will become a joint employee of Google and UCSB. Some other members of his team of about 20 researchers also will join

Google, he said, without disclosing a precise number.

Quantum computing takes advantage of the unusual behavior of sub-atomic particles. Where conventional computers handle binary bits of data — expressed as either ones or zeroes — quantum theorists talk of qubits that can be ones, zeroes or both at the same time. Quantum computing promises to exploit all combinations of bits simultaneously, making it possible to complete some kinds of calculations at extremely high speed.

Applications proposed for the technology include cracking data encryption by factoring large numbers much faster than today's systems can achieve. Drug-discovery research and financial modeling are also proposed as targets.

Only one company, D-Wave Systems, claims to be selling quantum computers. Founded in 1999, the Vancouver-based company in 2011 shipped a machine ordered by Lockheed Martin to a facility near Los Angeles run by the University of Southern California. The only other system shipped so far resides near Google's headquarters in Mountain View, Calif., as part of a collaboration between the company and the National Aeronautics and Space Administration. D-Wave's machine was the subject of a Time magazine cover story in February 2014. It has also prompted conflicting scientific papers as to whether it exhibits true characteristics of a quantum computer.

But Hartmut Neven, Google director of engineering, said his company will continue to collaborate with D-Wave scientists and to experiment with its quantum computer at the NASA Quantum Artificial Intelligence Laboratory. That system, which processes around 500 qubits, will be upgraded to a processor with roughly 1,000 qubits, he added.

Both the UCSB and D-Wave systems require cooling to nearly absolute zero, or minus 459 degrees Fahrenheit. But there are some technical differences.

The UCSB team earlier this year published a paper in Nature featuring a five-qubit array that showed advances in correcting certain errors that can occur during the fragile conditions that create quantum effects. Martinis said he hopes the new project will yield technology that "will not lose its memory" as fast as earlier hardware.

Yet he also expects to benefit from Google's continued work with D-Wave, including investigations into applying such technology. "We view this as a complementary approach to what D-Wave is doing," Martinis said.

http://blogs.wsj.com/digits/2014/09/02/google-backs-second-quantum-computing-effort/

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