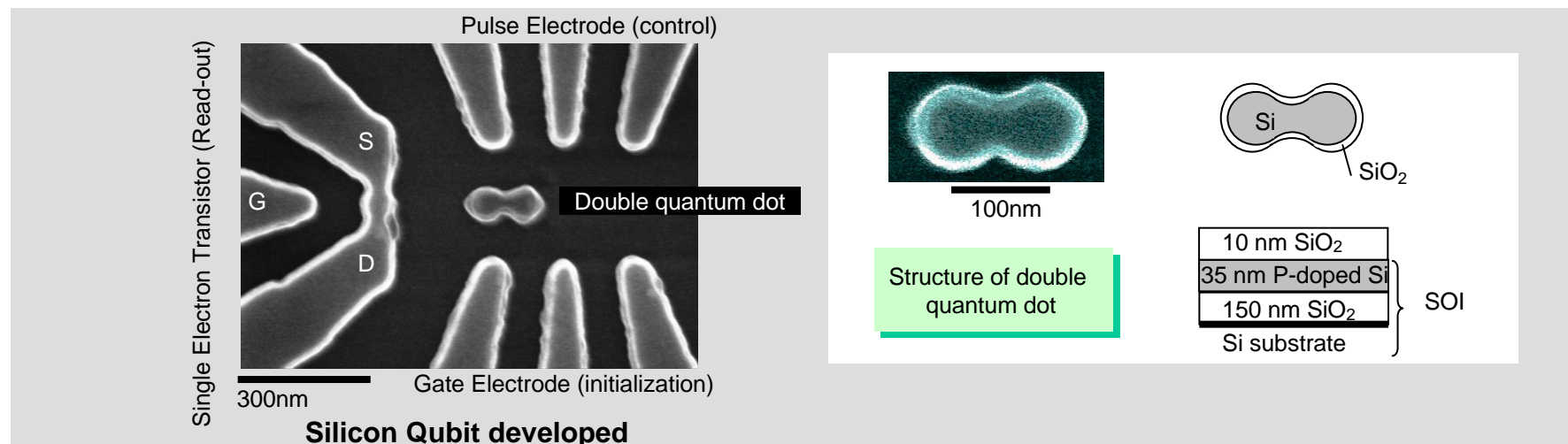


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## Breakthrough in development of quantum computers - Hitachi-Cambridge team develops a new Si qubit -



Hitachi Europe Ltd. announced that a Hitachi-Cambridge team has developed a new silicon device for quantum computing: a quantum-dot charge qubit. The research team achieved significant breakthroughs in what previously were considered the weak points of semiconductor quantum dot systems: short coherence time and scalability. Using an isolated double quantum-dot as a qubit, all operations were achieved using electrodes for initialisation and manipulation, and a single-electron transistor for measurement. The scheme provides a long coherence time (100 times longer than shown in other solid-state implementations) and flexibility in design, as the qubits may be combined in a variety of two-dimensional circuits, as in conventional microprocessors. In conclusion, the team successfully demonstrated qubit operation of a silicon circuit, made using standard fabrication techniques. This structure, based on years of work on single electron devices, is the first step in the development of a quantum computer based on conventional silicon technology.

The report on these findings will be published in Physical Review Letters in August 2005, and will be presented at the 8th International Symposium on the Foundations of Quantum Mechanics in the Light of New Technology (ISQM-Tokyo '05), to be held at the Advanced Research Laboratory, Hitachi, Ltd., Japan in August.