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Quantum Computing Has Limits

Technology Research News September 11, 2003

There are many long-term research efforts aimed at eventually producing a quantum computer, which would use the traits of atomic particles like electrons, photons and atoms to compute.

Although it is extremely difficult to use such infinitesimally small parts, the weird quantum trait of entanglement would allow calculations to be carried out all at once on a series of numbers, making quantum computers fantastically fast. In theory, they could solve large problems that could never be solved by classical computers, including breaking all security codes.

Quantum computers are not likely to ever replace classical computers for everyday use, however.

Researchers from the University of Arkansas and Texas A&M University have shown that quantum computers, while theoretically useful for very large problems, are likely to always need very large amounts of power.

According to their calculations, the statistical nature of quantum data, the practical requirements of inputting data into systems capable of carrying out entanglement, and the difficulty of error correction, or checking data, make quantum computers less efficient than classical computers for all but a few types of problems.

The work appeared in the September, 2003 issue of *Fluctuation and Noise Letters*.

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