LABORATORY FOR COMPUTER SCIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PHYSICS OF COMPUTATION SEMINAR

Date: Monday, June 7, 1993
Time: 2:00pm
Place: 6-120

A Technologically Feasible Quantum Computer

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Arrays of weakly-coupled quantum systems can be made to compute by subjecting them to a sequence of electromagnetic pulses of well-defined frequency and length. Such pulsed arrays are true quantum computers: bits can be placed in superpositions of 0 and 1, logical operations take place coherently, and dissipation is required only for error correction. When operated at optical frequencies, the array could provide massively parallel computation at clock cycles of pico- to nano- seconds. None of the steps involved in constructing or operating such a computer lie out of the reach of current technology.

Host: Norm Margolus

This is the first talk in a new seminar series on adapting computers and computations to the constraints of, and opportunities afforded by, microphysics; and on the application of physical theory of computation and information to the study of physical systems. Future talks will address such topics as The Thermodynamics of Computation, Quantum Information Theory, Quantum Complexity Theory, Computations on 3D Lattices of Simple Processors, and Reversible Computation.

This series is being sponsored by the MIT Information Mechanics Group (Lab for Computer Science), in conjunction with the MIT Physics and Media Group (Media Lab), the MIT Porous Flow Project (Earth, Atmospheric and Planetary Sciences), and the Mathematical Sciences Research Group at Thinking Machines Corporation.