Optical memory system

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Invention

Although the speed of computer processors has been improving dramatically, this increase in processor capability has not been matched by a comparable increase in data storage densities. Recent attention has focused on the use of two-photon absorption processes to store data in three dimensions. This approach provides the potential to store orders of magnitude more information in the same size enclosure as a two-dimensional optical disk memory and enhance data read/write speeds and system bandwidth. However, the two-photon absorption process requires the generation of high laser intensities, and data integrity is compromised by spurious photochemistry outside the target volume. The technology proposed here replaces the two-photon process with a sequential two-photon method, which provides the same advantages while simultaneously using much lower power densities and obviating the need for expensive laser diodes. The branched-photocycle method provides a system that allows high density random access data storage with high read/write speeds without compromising the integrity of the data.

Technology

U.S. Patent No. 5,559,732

A light-transducing protein storage medium, either bacteriorhodopsin or a variant of this protein optimized for this architecture, is used in a branched-photocycle volumetric memory to store information in three dimensions. The architecture provides not only high storage densities, but paged access yielding very high bandwidths and storage densities.

Application

High density random access data storage

Advantages

- Less laser excitation intensity is required, lowering cost
- Unwanted photochemistry outside the irradiated volume is eliminated, enhancing data integrity
- Parallel read/write architectures are more easily implemented, increasing speed

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