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3D Atomic Holographic Optical Storage Nanotechnology

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Abstract

Colossal Storage Inc. has licensed 5 year old patents on new ways of non - contact reading and writing with non destructive reading of information to a ferroelectric molecule.

1. Introduction

The Colossal FE Optical Drive density of 40 gigabits/sq.in. up to 40,000 Terabits/cu.cm.[1]
A comparison with harddrives of today is around 4 gigabits/sq.in. maxing at ~200 gigabits.[2] With optically assisted / Blu - Ray drives maxing at ~45 gigabits/sq.in. and contact recording AFM, STM, SPM or SFM, i.e. atomic force microscope and their derivatives, maxing practically out at about ~300 gigabits/sq.in..

2. First Time in the History of Mankind

Colossal Storage uses the Einstein/Planck Theory of Energy Quantum Electrons to control molecular properties by an atoms electron movement/displacement. [3] The Colossal Storage FeDrive - FeHead Semiconductor Integrated Optical Read / Write Head will use Ultraviolet/Blue laser diodes with Voltage transducer to write, photon induced electrical field poling, and UV/Blue laser diode and Nanooptical transistor or Nanofloating gate Mos Fet to read.

2.1 Atomic Switch Controls Optical Data

Molecular dissociation following Thomas' patents cover methods for a non-contact ultraviolet / blue laser photon induced electric field poling using UV at the same wavelength as a molecular transition will create controllable clouds of electrons in harmonic waves (plasmon).

Some organic/inorganic molecules have resonant valence orbit electrons that under the proper Quantum UV/Blue photoexcitation allow conduction band electrons to move freely for a short time. Plasmon known as electric current along with the electric field present providing a mechanism for ferroelectric perovskite molecules to switch binary positions. The unique concept of resonant absorption excitation by UV/Blue light causing molecular dissociation and simultaneous electric field application (Pockels effect) can be used for writing 3D volume data so when it is read back having coherent interference waves in a beam of UV/Blue photon radiation.

The single frequency creates many bright or dark bands from the UV light that are in phase or out of phase with one another. The diffraction by the bistable state nucleus in the center of ferroelectric dipole molecule can therefore be represented as a binary 0 or 1.

Ferroelectric non-linear photonic bandgap crystals offer the possibility of controlling and manipulating light within a UV/Deep Blue frequency. The small size of ferroelectric transparent structures makes it possible to fabricate nano-optical devices like volume holographic storage having both positive and negative index of refraction.
The ability to control the diffraction of Ultraviolet photons makes the ferroelectric perovskite NLO photonic materials very attractive for the research and development of 3D volume holographic optical

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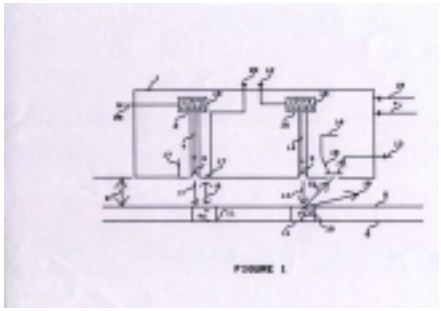
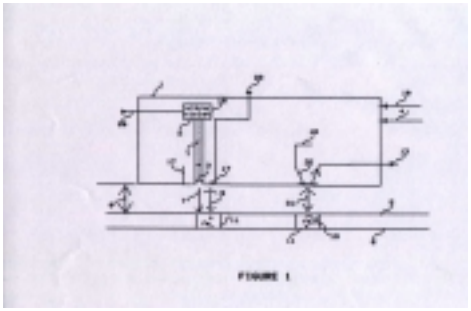
storage. Furthermore, ferroelectric non-linear photonic crystal structures provide the ability for infinite rewritability of a non-volatile holographic storage drive.

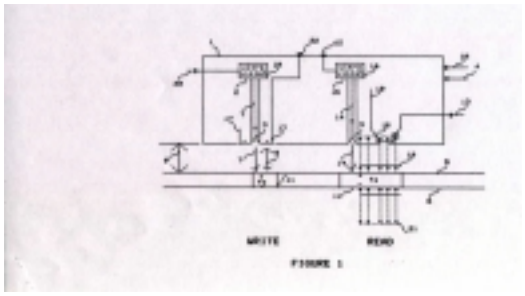
The outstanding potentials of ferroelectric molecular materials will revolutionize 3D volume holographic optical storage technologies along with several challenges in design, optimization, fabrication, and characterization an provide for further extensive research and development activities in the field of ferroelectric holographic materials and data storage.

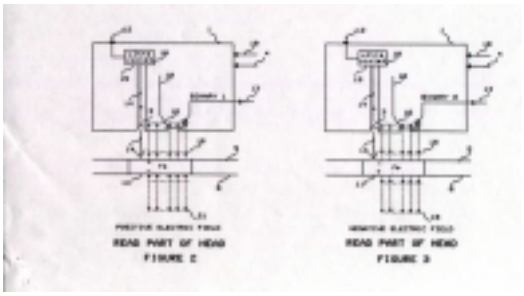
All other known attempts at rewritable holographic storage use electrons clouds to store data and as a result have only been able to achieve write once read many devices. Thomas feels this method can never overcome the Niels Bohr Atomic Theory of electron recapture and therefore this type of Bragg/Compton Scattering recording technique is usually destructive readout and a short data storage shelf life like spatial spectral hole technology.

2.2 Semiconductor Integrated Optical Read / Write Head and Function









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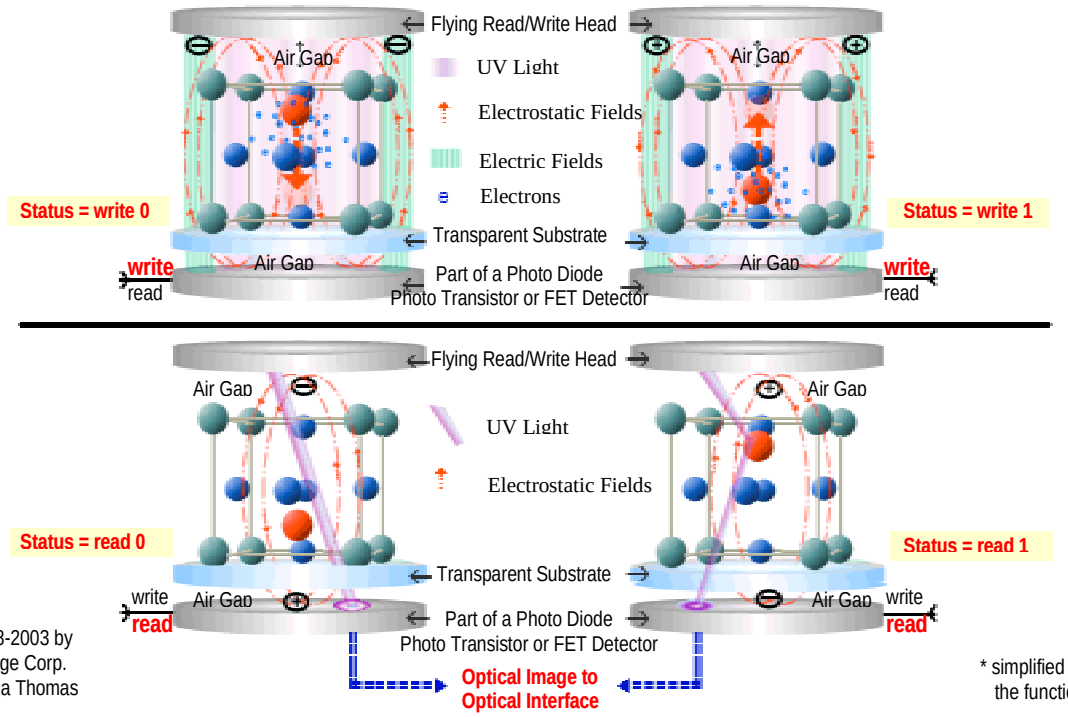
Schematics Atomic Switch *



* simplified schematics schowing the function of one molecule

3. Conclusions

The Colossal Storage FE Optical Drive will offer symmetrical non-destructive read and writes for the retention of data storage for 100-years or more. Thomas patents on a semiconductor read/write head for ferroelectric optical storage media memories promises to raise data storage densities by a factor of 1000 or more and will add at least 10,000 times the data storage capacity per peripheral storage footprint.

Bibliography

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