

LOW FIELD MAGNETIC DOMAIN WALL INJECTION PAD AND HIGH-DENSITY STORAGE WIRE

Marquette Invention Disclosure: MU-DS-09-006-Kunz

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State of the Art

Magnetic domains are the main scientific principle behind all magnetic storage ranging from the information coded on your card to the data on a computer hard drive (HDDs) to the massive storage servers. Currently all computer hard drives, HDDs, are essentially thin films covering a flat disk on which the data is written. Disk storage per unit space has roughly doubled every 18-24 months for about the past 40 years in accordance with Moore's Law. The primary force behind this growth has been the ability to read and write information using less and less space. However, the limits of this growth method are reaching an endpoint as the technological hurdles of reducing space and signal grow.

New technologies and methods are needed to further increase disk storage per unit space. One potential technology is the use of small magnetic wires (nanowires) which could be grown three-dimensionally creating new layers for data storage. Another potential technology is the use of patterned media meaning small, nanometer dimensioned, magnetic islands on the disk surface where each island would be one magnetic bit.

Invention

The present invention utilizes a novel magnetic storage apparatus/method using nanowires that increases potential data storage. To increase potential magnetic memory storage, this invention utilizes a novel geometry to optimize the location of an injection pad and magnetic nanowire for high density memory storage applications by low magnetic field domain wall shifting.

In addition to the standard-two-dimensional structure for magnetic storage technology, the nanowires in this invention could be structured in a three-dimensional pattern further expanding the potential amount of data storage. Moreover, the invention may be used in patterned media storage where the invention would allow more than one bit of information to be stored per island and again increasing the potential amount of data storage. Overall, this invention has the potential to revolutionize the magnetic data storage field.

Stage of Development

The present invention has been demonstrated through computer simulations. Based on the computer simulation results, the inventor is currently designing and building a prototype of this magnetic memory technology to confirm the inventions utility and value.

Patent Protection

A U.S. provisional patent application has been filed for this invention.