PURDUE INNOVATES | Office of Technology Commercialization

Near-Field Transducer for Heat-Assisted Magnetic Recording

A new near-field transducer for Heat-Assisted Magnetic Recording (HAMR) can significantly increase hard drive storage density limits beyond current magnetic storage capabilities.

Modern hard drives store data using the polarity of billions of tiny magnets to represent the corresponding bits of information. The number of magnets that fit onto a device's disk or platter determines storage density. To further increase storage density, a more coercive magnet must be used, requiring a stronger magnetic field. Eventually, it will become impossible to create a magnetic field strong enough to permanently affect the data, which is a problem for hard drive manufacturers.

Heat-assisted magnetic recording (HAMR) solves this problem by selectively heating the magnets above the Curie temperature, making them lose their coercivity so that a weaker magnetic field can change the data. Researchers at Purdue University have developed a new, near-field transducer for HAMR applications that could increase the storage capacity of high-density hard drives. Disks using HAMR technology could increase the limit of magnetic storage by more than a factor of 100 and create densities of 50 terabits per square inch.

Advantages:

-Higher magnetic storage densities

TRL: 4

Intellectual Property:

Provisional-Patent, 2014-03-24, United States | Utility Patent, 2015-03-23, United States

Technology ID
2013-XU-66482

Category
Semiconductors/Fabrication & Process Technologies
Semiconductors/Devices & Components
Materials Science & Nanotechnology/Thermal Management Materials & Solutions

Authors
Edward Kinzel
Xianfan Xu

Further information
Parag Vasekar
psvasekar@prf.org

View online

Keywords: Heat-assisted magnetic recording, HAMR, high-density hard drives, magnetic storage, storage density, near-field transducer, Curie temperature, coercive magnet, hard drive manufacturers, magnetic field, Circuits, Computer Hardware, Electrical Engineering, Sensors