

Data storage using ultra-small needles

Dutch researcher Alexander le Fèvre has demonstrated that a field-emission current signal can be used to arrange the position of thousands of nanometre-sharp needles. These probes can be applied to write and read in new storage media with an extremely high density, using bits on a nanometre scale.

The development of the hard disk is now reaching its technical limits because the entire disk is served by just a single head. Consequently, the capacity of the disk and the reading and writing speed cannot expand much more in the future.

Therefore research into a memory based on probes is being carried out at the University of Twente's MESA+ research institute. Being able to control the position of each separate probe is essential for realising a system with extremely high densities.

Le Fèvre's measurements show that a field-emission current signal can be used to adjust the position of the probes without these making direct contact with the storage medium. If a constant current is maintained and the applied voltage is varied, the distance between the probe apex and the storage medium can be adjusted from several nanometres to about 100 nanometres.

The resolution is sufficient for a probe-based storage system. However for practical applications, the current stability and the lifetime of the probes will need to be improved further so that the accuracy and reproducibility of positioning can be increased.

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