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Reading a Magnetic Non-Erasable Magnetic Memory ALAN EDELSTEIN, GREG FISCHER, JONATHAN PETRIE, ROBERT BURKE, US Army Research Laboratory — Two major disadvantages of current magnetic memory are that it can be erased by inadvertently applying a magnetic field and the superparamagnetic limit is beginning to make it difficult to increase the density of magnetic recording without further limiting the already too short storage lifetime of seven years. The superparmagnetic limit can be expressed as the requirement to store information for 10 years requires that $KV/k_BT > 50$, where K is the crystalline anisotropy, V is the volume of the bit k_B is the Boltzman constant and T is the absolute temperature. Alternative methods of information storage, at present, do not have the density of magnetic memory and generally do not store information indefinitely. We have demonstrated a method for reading media in a new magnetic non-erasable memory technology based on regions of high and low magnetic permeability. We have been able to use magnetic tunnel junctions and a probe field to read 10 micron wide lines of a soft magnetic material, permalloy, with a signal to noise ratio of 45 db.

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