

8-5 Permanent Magnets and Magnetic Recording

Reading Assignment: *pp. 265-268*

Recall that we studied **permanent magnets** in section 8-3.

Permanent magnetization allows us to “**store**” data on **magnetic media**—for example, your computer **hard disk!**

HO: Magnetic Recording

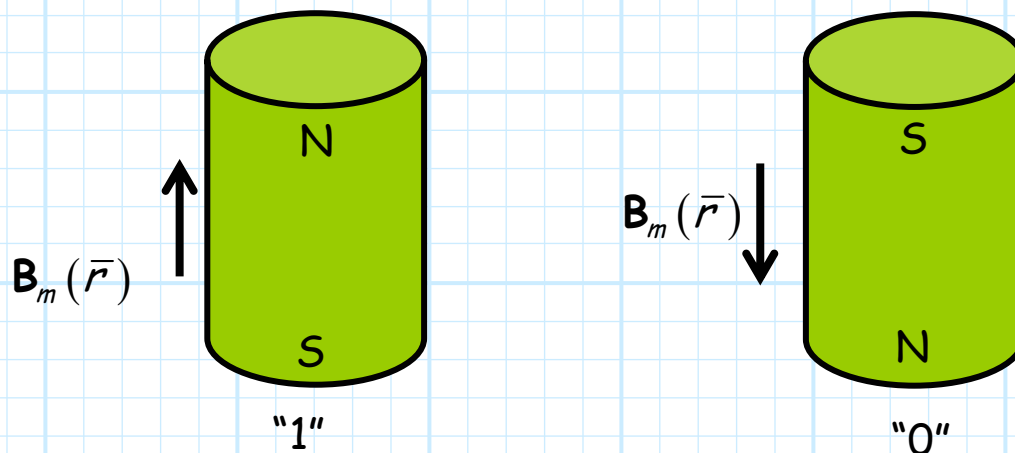
Magnetic Recording

An interesting application of ferromagnetic material is in non-volatile **data storage** (e.g., tape or disk). Ferromagnetics can be used as **binary memory** !

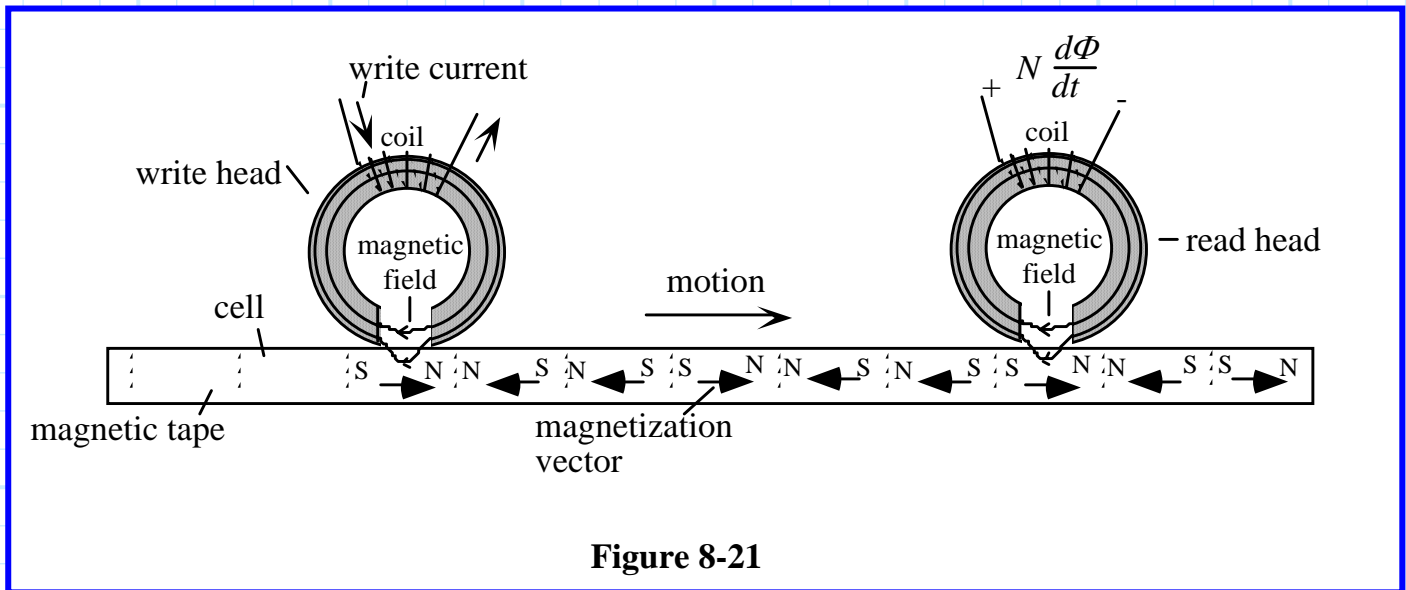
Q: *How?*

A: Recall that the magnetization vector in ferromagnetic material retains its direction after the magnetizing field $\mathbf{B}_m(\vec{r})$ has been removed. In other words, it "**remembers**" the direction of the magnetizing field.

We can assign each of **two** different magnetizing directions, therefore, a **binary state**:



If ferromagnetic material is **embedded** in a tape or disk, we can magnetize (e.g., **write**) small sections of the media, or detect the magnetization (e.g., **read**) small sections of the media.



This is the basic principle behind the operation of your **computer hard disk!**

Q: *I see how the magnetic "write head" works, but what is going on with that magnetic "read head"?*

A: The read head is using **Faraday's Law** to detect **changes** in the tape/disk magnetization. Conveniently, Faraday's Law is the subject of our **next section!**