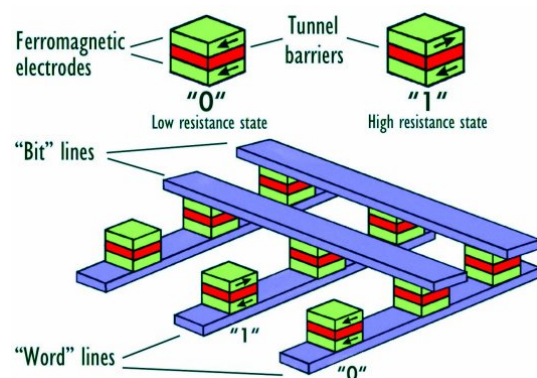
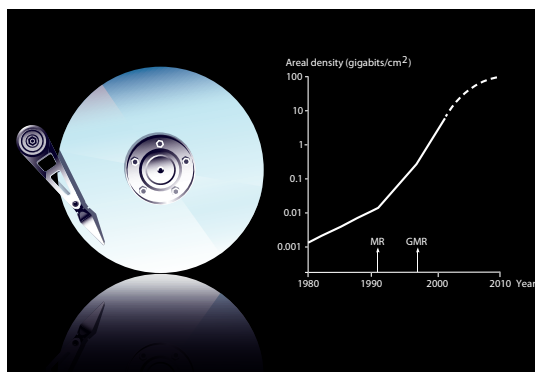


Giant Magnetoresistance

The Begin of Spintronics – Awarded with the Nobel Prize in Physics 2007

In 2007 the Nobel Prize in Physics was awarded to the Frenchman Albert Fert and the German Peter Grünberg for the discovery of the Giant Magnetoresistance (GMR) effect. The direct application of this new technology was quickly identified in building a new type of reading heads for hard disks. Not even ten years after the discovery of the new technology the first commercial GMR-head was produced in 1997 and became the standard in technology. GMR meant a breakthrough for reading tightly packed informations from hard disks and lead the way to the age of smartphones and tablets, which become always smaller although their storage space increases. In this sense GMR is a good example of how an unexpected fundamental scientific discovery can quickly give rise to new technologies and commercial products.

The talk of course aims to give a introduction to the concept of Giant Magnetoresistance, including a short introduction to magnetoresistance and the physics of magnetic multilayer systems. Besides the obvious application for reading heads the presentation will give a short overview of the so called magnetoelectronics or spintronics, where GMR played the role of a door opener. Spintronics is today one of the driving forces for new applications in nanotechnology and the talk will show this by the example of the development of a magnetic working memory so called MRAM, which provides the advantage to combine a permanent memory with the speed of today's random access memories. So after the presentations of quite a lot new kinds of electronics during the series of our talks, like for example in "*Graphene field-effect transistors*" and "*Photonic Crystals*", this talk will offering another very interesting one.



Left: A picture of an actual hard disk with reading head. The diagram showing the accelerating pace of miniaturization in information technology¹; Right: Scheme of a MRAM².

¹Royal Swedish Academy of Sciences. The Nobel Prize in Physics 2007 – INFORMATION FOR THE PUBLIC, October 2007

²URL http://www.colorado.edu/physics/phys3220/phys3220_sp05/images/ftjm.jpg