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## **Spin-electronics: A New Challenge in Science and Technology**

Spin-electronics is a new field of science and technology in which one attempts to combine materials and properties of electronics and magnetism in order to obtain new physical phenomena and pave the way towards new technological applications.

Some applications are already available on the markets, such as read-out heads for magnetic hard disks, and magnetic sensors, based upon the effect of giant magneto-resistance (GMR). Another extremely promising potential application concerns the non volatile magnetic random access memories (M-RAM) based upon the effect of tunneling magnetoresistance (TMR).

I shall discuss the most investigated spin-electronics phenomena: giant magnetoresistance and tunneling magnetoresistance. Further studies involving injection of a spin polarized current from a ferromagnet into a semiconductor and spin-polarized electronic transport in a semiconductor will also be presented.