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Research and applications: from the spin* of the electrons to our computers and telephones

Spin* electronics is mainly known for the considerable increase of the information stored in hard discs brought by the discovery of the so-called Giant Magnetoresistance phenomenon (GMR). Actually, the discovery of the GMR was only the first step. Many other interesting “spin effects” have been rapidly found and today spin electronics can be presented as a new type of electronics exploiting not only the charge but also the spin of the electrons. After a review of some of the recent advances, I will describe their present and future impact on the Information and Communication Technologies. I will also present some new emerging research directions and their fascinating perspectives for the technologies of our century.

* The spin is the small magnet carried by the electron