

Freitag, 20. Mai 2011, 17:15 Uhr 

Max-von-Laue-Kolloquium

Freie Universität Berlin, Fachbereich Physik,
Großer Hörsaal, Arnimallee 14, 14195 Berlin

Moderation: Wolfgang Buck und
Klaus Baberschke (PGzB)

Nobel Laureate 2007 Prof. Dr. Albert Fert

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The world of spintronics: electrons, spins, computers and telephones

Spintronics is a recently emerged field of research which exploits the influence of the electron spin on electronic transport. It is mainly known for the large increase of the hard disc capacity by read heads based on the “giant magnetoresistance”, but it has also revealed many other interesting effects. After an introduction on the fundamentals of spintronics, I will review some of the most promising directions of today, which will include the study of the spin transfer phenomena, spintronics with semiconductors, spintronics with carbon nanotubes or graphene, neuromorphic devices..... In a spin transfer experiment, for example, one manipulates the orientation of a nanomagnet by transfusing spin angular momentum into it from a spin-polarized electronic current. This electronic spin transfusion can be used to switch the magnetization (with near applications to the writing of magnetic memories) or to generate oscillations in the radio-wave frequency range (with promising applications in telecommunications). Spintronics with semiconductors aims to some fusion between conventional electronics and spintronics, while carbon-based spintronics turns out to be a possible way to go “beyond CMOS”, that is beyond the silicon electronics of today.