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Ca' Foscari
University
of Venice

Department of
Molecular Sciences
and Nanosystems

**Being a scientist
nowadays: different
perspectives in
conversation**



The event will be held in English

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Info
Ufficio Promozione Culturale
eventi@unive.it

Nobel Laureate
**Albert
Fert**

meets Ca' Foscari
students

9 September 2022



Fert was born in Carcassonne, France, in 1938. He studied physics at the École Normale Supérieure from 1957, graduating in 1962 to the Université de Paris where he gained his master's degree for a thesis on nuclear magnetic resonance (NMR). He followed this with his PhD in 1970 at the Université Paris-Sud for his work on the transport properties of nickel and iron. Fert worked throughout his studies – as an assistant at the Université de Grenoble from 1962–64, followed by a year spent in national military service. He then joined the Université Paris-Sud as a senior assistant until 1976 when he was promoted to professor of physics. He has remained there ever since, now as professor emeritus. From 1970–95 Fert led a research group at Paris-Sud's Laboratoire de Physique des Solides and it was there that he discovered GMR, with his team working in collaboration with the company Thomson-CSF (now Thales). Since 1995, Fert is scientific director of the combined CNRS/Thales Joint Physics Unit.

Albert Fert shared the 2007 Nobel Prize in Physics with Peter Grünberg for their independent but almost simultaneous discovery of Giant Magnetoresistance (GMR) in 1988. The phenomenon is a quantum effect based on the influence of the orientation of the electron spins on the electrical conduction in nanostructures based on magnetic metals. The discovery is recognized as the birth of spintronics, a research field often described as a new type of electronics exploiting not only the electric charge of the electrons but also their magnetism (their spin). Spintronics became rapidly an important field of research with a great potential of applications in the Technologies of Information and Communication. GMR itself boosted the capacity of information storage in hard drives. Hard disks store information in minute magnetic parcels, which are then read and decoded into text, images or sound. To get a larger density of stored information naturally involves compressing the parcels, resulting in a weaker signal that GMR is able to detect. GMR is also used today in different types of magnetic sensors as the compass of some smart phones.

After 1988, Fert and his team contributed significantly to the development of spintronics. They published an early observation of magnetoresistance in "Magnetic Tunnel Junctions (MTJs)" based on magnesium oxide (the type of MTJs used today in spintronic devices) and were among the first groups having studied the so-called spin-transfer-torque effects. In addition, Albert Fert and his co-worker Thierry Valet introduced the important theoretical concept of spin accumulation in the interpretation of spintronic phenomena.

After the Nobel Prize in 2007, Fert oriented his research in the emerging direction of the exploitation of topological properties in spintronics. He was one of the main pioneers of the research on the "magnetic skyrmions", a novel important axis of the research in magnetism. His recent works are on other phenomena related to topological effects in condensed matter physics as, for example, the conversion between electrical and spin currents in materials called topological insulators.

Friday, 9 September 2022,

h. 3.00 pm

Aula Baratto, Ca' Foscari

Dorsoduro 3246, Venezia

Institutional greetings

Tiziana Lippiello, Rector of Ca' Foscari
University of Venice

Introduced by

Stefano Bonetti, Professor of the Department
of Molecular Sciences and Nanosystems

In conversation with **Laura Cattaneo**, Junior
research group leader at Max Planck Institute

Moderated by

Caterina Vozi, Research Director at CNR