Título:

"The magnetism of oxides"

Coloquialista:

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Resumo:

Magnetite Fe₃O₄ guided the humankind towards unknown frontiers. Since those early days, oxides have been the backbone of many scientific and technologic developments and reached a peaceful maturity, robustly settled in textbooks and deeply integrated in technological applications, until late 1980’s when the high temperature superconductors were discovered. The subsequent rush stimulated an impressive development in oxide thin film growth technologies and a deep revision of the understanding of metal oxides and strongly correlated electronic systems which ultimately boosted a tremendous explosion of research on oxides. Today, long
beyond the celebrated colossal magnetoresistance, oxides are fuelling the discovery and
development of unexpected, intriguing and fascinating new areas of knowledge, such as
magnetic ferroelectrics and magnetic monopoles. Ferromagnetic oxides are finding its way as
active components in spintronics, either as spin filters for advantageous magnetic tunnel
junctions or used to manipulate spins in non-magnetic materials, which could eventually lead to
pure spin-current based rather than charge&spin-based devices, with prospects of more
energy-efficient spintronic devices. The tinny spin-orbit coupling interaction, responsible for the
magnetic anisotropy, has also emerged as a fundamental interaction allowing to modulate
electric transport properties, not only of metallic ferromagnetic systems but also in
antiferromagnetic metals and insulators that may lead to a new generation of magnetic
memories. Still, “interface is the device” and interfaces between oxides and metals and
interfaces between large band-gap oxides have led to the discovery of emerging properties
such as switchable “on-off” magnetization or magnetism and superconductivity that challenges
our understanding of oxides. This is the playground where we happily play, learn and envision
the future while enjoying building a new science out of the old good oxides. Along the seminar,
we will jointly follow the track of the new materials and ideas that make this journey possible
and so successful.

Data, horário e local:

11 de Novembro de 2016, 16h

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