Superconductors : the Magic and the Mystery

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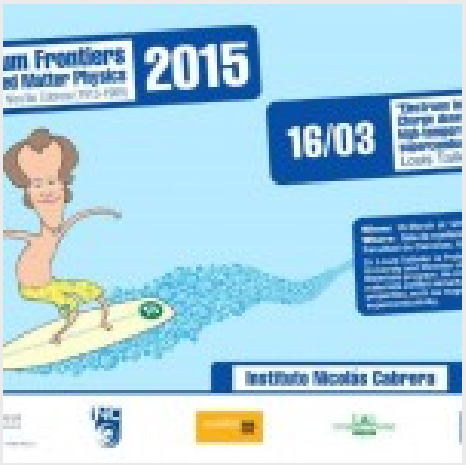

Title: Superconductors : the Magic and the Mystery
When: Monday 16 March, 15h00
Where: Sala de conferencias módulo 00, Facultad de Ciencias.
Speaker: Louis Taillefer, Sherbrooke University, Canadian Institute for Advanced Research
ABSTRACT:

Superconductivity is a magical property of matter, whereby electrons enter spontaneously into a macroscopic quantum dance in which electricity flows perfectly. Were this state sustainable at room temperature, our technological world would be profoundly transformed. The most promising materials are the copper oxides that remain superconducting halfway to room temperature. But the long-standing mystery of what binds electrons into pairs to form superconductivity has prevented scientists from understanding how this maximal temperature might be raised.
In my talk, I will discuss some of the magic of superconductors, properties harnessed to image brains in hospitals, whiz subatomic particles around at CERN, and levitate trains in Japan. I will also describe some recent advances in research that have shed new light on the mystery. In particular, I will discuss the role of charge-density-wave modulations that have recently been discovered to coexist and compete with superconductivity.
This is a story of electrons and scientists, featuring very low temperatures, huge magnetic fields, high pressures, pristine crystals, powerful microscopes, and the quantum world.