INVITADO: ADOLFO DEL CAMPO, Los Alamos National Laboratory, Theoretical Division.

TITULO: **Shortcuts to adiabaticity in quantum devices**

LUGAR: FACULTAD DE CIENCIAS FÍSICAS UCM
DÍA: 20 de Diciembre, 2011 (Martes)
HORA: 14:30
AULA: Seminario Depto. Física Teórica I, Planta 3ª

ABSTRACT

"Fast good" is a new culinary concept envisioned by the chef F. Adrià aimed at creating a diet enjoying of two apparently mutually-exclusive features: fast-service and high-quality. When similar ideas are invoked in the quantum realm, one faces the adiabatic theorem which imposes a price. The preparation of a given target state with high-fidelity, free from spurious excitations, generally demands a long time of evolution and the implementation of an adiabatic dynamics. In this talk, I will present recent theoretical advances and experimental progress in the design of shortcuts to adiabaticity in quantum systems by a variety of complementary approaches, such as the use of adiabatic invariants, inversion of dynamical scaling laws, the transitionless quantum driving algorithm, and inhomogeneous quenches (time-permitting). These methods will be applied to the control of ultracold gases and trapped ions, with special emphasis in many-body aspects. In particular, a proposal to realize a quantum dynamical microscope will be discussed.