



CICLO DE SEMINARIOS 2016-2017
DEPARTAMENTO DE QUIMICA-FÍSICA I
UNIVERSIDAD COMPLUTENSE DE MADRID

Martes 20 de Diciembre de 2016 – 12:30 h
Sala de la Antigua Capilla

**Spatial Adiabatic Passage:
Interactions, Particle Separation, and Shortcuts**

Albert Benseny

Okinawa Institute of Science and Technology

One of the routes to develop quantum technologies is to follow a bottom-up approach where one first develops manipulation techniques for a single particle, and then scales them up by adding more particles to the system. In particular, ultracold atoms trapped in optical potentials are very promising in that regard, as they are a highly controllable system.

Adiabatic techniques are widely used for quantum manipulation, as they typically yield high fidelities and are very reliable. Spatial adiabatic passage (SAP) techniques are a family of very versatile techniques that allows a control over the external degrees of freedom of ultracold atoms. They rely on coupling different spatial eigenstates via a controllable tunneling interaction.

In this talk I will present the basic concept of SAP for a single atom, and then move on to some of its extensions. I will show how to extend the technique to multiple atoms, and how to speed it up using shortcuts to adiabaticity.