ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

ΤΜΗΜΑ ΦΥΣΙΚΗΣ

# ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

# *PHYSICS COLLOQUIUM*

Thursday, 4 March 2010
17:00-18:00

3rd Floor Seminar Room

## *"Hybrid Superconducting Junctions"*

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Abstract

A short discussion on tunneling Josephson junctions (S/I/S, with I an insulator) which present a very rich nonlinear behavior and are behind several applications with low temperature superconductors, mainly as a basic electronic element. Tunneling between superconductors is both a phase sensitive test of the order parameter symmetry in unconventional superconductors, but also a physical process for device applications.. Here we are considering clean hybrid Josephson junctions S/X/S, where X is a metal, semiconductor, ferromagnet, or superlattice. Heterostructures consisting of magnetically active layers provide new possibilities for manipulating transport, and have led to the discovery of a number of fundamentally new phenomena.. Among those is the transition from a 0-state to a pi-state in S/F/S junctions, which can be controlled by temperature variation, The main transport mechanism is via the Andreev bound states. In the case of strong interface scattering there is interplay between normal scattering processes and Andreev electron-hole cycles (ABS), in the case of graded interlayers. Studies of non-coplanar varying magnetization will be discussed.

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