CRETE CENTER FOR QUANTUM COMPLEXITY AND NANOTECHNOLOGY

UNIVERSITY OF CRETE DEPARTMENT OF PHYSICS

CAPACITIES

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 6 April 2017

17:00 -18:00

3rd Floor Seminar Room

" Quantum technology and the control of coherence in quantum networks "

Prof. George Tsironis

Department of Physics, Univ. of Crete, Greece

Abstract

Macroscopic quantum devices are becoming reality not only for computational purposes but also as sensors and for other general applications. A quantum superconducting chip with reasonable number of qubits -of order 20- is close to being build with decoherence times in the order of milliseconds. In this talk we will focus on superconducting technology and analyze the emergence of coherence in coupled networks of meta-atoms made of units such as SQUIDS and Josephson junctions. These networks may operate classically in a negative permeability regime, induce intrinsic nonlinear localized modes, tame disorder through hysteretic loops or transmit through nonlinear frequency bands. In the quantum regime, on the other hand, meta-atoms may interact through injected electromagnetic fields and form propagating "quantum breathers", i.e. compound semiclassical propagating modes induced by the nonlinearity of the qubit-field interaction. These coherent modes generate self-induced transparency in the medium and in certain cases may also induce superradiance.