



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 29 October 2009
17:00-18:00

3rd Floor Seminar Room

*"Delay Dynamics in semiconductor lasers coupled by
orthogonal polarization modes."*

A. Gavrielides

European Office of Aerospace, Research and Development,
London, UK

Abstract

A review of the emission dynamics of semiconductor systems under optical delayed feedback will be presented. We will also present a detailed analysis for the emission dynamics of two semiconductor lasers coupled through the non-lasing delayed orthogonal polarization mode. The presentation includes experiments, numerical modeling and bifurcation analysis. Two diode lasers coupled bidirectionally with delayed feedback will be analyzed and the computations reveal that the experimentally observed asymmetric waves and other similar waveforms are metastable. A simple analytical two neuron coupled model that captures the essential features of the metastable waveforms and show analytically that the waveforms approach and vanish exponentially to the steady states for long delays. We review the steady states stable and unstable and show that the metastable states are indeed supported by the spontaneous noise present in diode laser. We also present numerical results that provide a support for the experimentally observed waveforms.