

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday 6 March 2008

17:00-18:00

3rd Floor Seminar Room

“Pellet-Fuelling of Magnetic Confinement Machines”
(Pellet-Plasma Interactions)

Paraskevas Lalousis

Institute of Electronic Structure and Laser-FORTH
Association EURATOM-Hellenic Republic

Abstract

Pellet injection is the leading method for refuelling magnetically confined plasmas for controlled thermonuclear fusion research. In fuelling magnetic fusion reactors with pellet injection, a relevant problem is the determination of the optimum pellet size, pellet velocity and injection frequency needed for replenishing particles losses and bringing fresh fuel particles to the plasma.

The evolution of pellet clouds in magnetically confined thermonuclear plasmas is studied by means of a time-dependent two-dimensional resistive MHD model applicable to the poloidal plane of a plasma torus. A massive neutral particle source representing a pellet traverses the plasma and continuously releases cold neutral particles. Its motion is confined to a poloidal plane, which is thus considered to be a symmetry plane of the model. The conservation equations supplemented by Maxwell's equations, Ohm's generalized law, and a number of rate equations are solved for the symmetry plane.

Results and comparisons with experiments will be discussed.

A brief discussion on the European Fusion Programme will also be given.