



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

SPECIAL PHYSICS COLLOQUIUM

Monday, 1 October 2012

15:00 -16:00

1st Floor Seminar Room

“Complex Nonlinear Opto-Fluidics: Controlling Flow with Light and Vice-Versa”

Prof. Mordechai Segev

Physics Department
Technion – Israel Institute of Technology

Abstract

The understanding of fundamental interactions of light and nano-suspensions is now rapidly growing - already giving rise to valuable technological advancements. The field of Opto-Fluidity has given rise to numerous devices and systems with unprecedented functionalities, e.g., liquid lenses of variable foci, liquid mirrors, liquid-crystal displays, and electro-wetting lenses. All of these techniques offer a means to control the optical properties of the devices by manipulating fluids. The opposite aspect, where light is used to manipulate fluids, has rarely been studied. In the past four years, we have started to go a step beyond that, and explored opto-fluidic systems where light dynamically modifies the properties of fluids and, in turn, light is affected by the same changes it induces. Such systems introduce complex interactions between the dynamics of light and the dynamics of fluids, as well as optical control over the mechanical properties of the fluid. These ideas will be presented, and several new ideas will be discussed, with an emphasis on our recent work demonstrating micron-scale optical manipulation of the local properties of dense, particulate-loaded, highly-scattering (opaque) suspensions of nanoparticles.