ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 8 December 2011
17:00 -18:00
3rd Floor Seminar Room

"Rogue waves and the statistics of extreme events in complex systems"

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Abstract

Rogue or freak waves are gigantic waves that "appear from nowhere" in relatively calm seas. Recent theoretical and experimental work associates them with breather solutions of nonlinear PDE's such as the Nonlinear Schrödinger Equation (NLS). Nonlinear optics experiments during the last few years have claimed the detection of "optical rogue waves" while experiments of microwave propagation in random media claim similarly the observation of "linear rogue waves". Extreme waves may also appear in discrete systems. We will review work on continuous systems and then focus on extreme event statistics in extended discrete networks. We will connect the appearance of these events to integrability properties of nonlinear lattices and show that extreme event recurrence time statistics provides information on the role that disorder and nonlinearity play in the emergence of extreme waves.