

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Wednesday, 9 May 2018

17:00 -18:00

3rd Floor Seminar Room

"Quantum chaos, thermalization and black holes"

Prof. Ben Craps

Physics Dept., Vrije Universiteit Brussels, Belgium

Abstract

Classical chaos refers to exponential sensitivity of phase-space trajectories to small changes in initial conditions. It is not straightforward to extend this notion to quantum systems, which undergo linear evolution and moreover do not exhibit precise phase space trajectories. One possible way to define quantum chaos is via statistical properties of energy levels, which have been related to those of random matrices. Recently, motivated by studies of black holes, exponential growth of out-of-time-order correlators has received a lot of attention as another possible diagnostic of quantum chaos, and an upper bound on the corresponding "Lyapunov exponent" has been obtained. Chaos is closely related to the thermalization of isolated quantum systems, for which the current paradigm is the Eigenstate Thermalization Hypothesis. Via gauge/gravity duality, quantum chaos is reflected in the physics of black holes, which are dual to thermal states. In the same way, the study of black hole formation has given a new handle on the thermalization of strongly correlated systems.