



European Research Council
Established by the European Commission

Università di Roma Tor Vergata
Dipartimento di Fisica



Seminar

Wednesday 10th October, h. 14.00

Room Fisica della Materia

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“Entropy Production in Turbulence Paramterisations”

Abstract

The physically consistent representation of turbulence subgrid-scale processes of forced dissipative systems like atmosphere and ocean requires the handling of statistical non-equilibrium fluctuations. The statistics of these fluctuations — as a fingerprint of the chaotic dynamics — provide useful insights into the dynamical response behaviour of a system. The goal of the TRR 181 sub-project M4 is the characterisation of the fluctuations of entropy production by means of the class of fluctuation theorems and their incorporation to develop stochastic parameterisation schemes of momentum and heat fluxes that are related to energy dissipation and backscatter. In this seminar, the idea of the construction of a parameterisation scheme of the shell-shell coupling in the Sabra shell model by use of a model reduction technique based on response theory and weak coupling assumption will be outlined. Partial results like the energy spectrum and energy fluxes of the reduced Sabra shell model containing a stochastic and a memory term will be presented. The importance of the memory term will be discussed as well as a possible study of this constructed subgrid scheme within the frame of stochastic thermodynamics leading to an appropriate definition of entropy production whose statistics fulfils the detailed fluctuation theorem.

ERC Advanced Grant (N. 339032) “NewTURB”
(P.I. Prof. Luca Biferale)

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