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Dipartimento di Fisica



Seminar

Wednesday, 4 February 2015 - h. 12:00

Sala Struttura della Materia (Dipartimento di Fisica)

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“Multifractal structure of fully developed turbulence”

Abstract

Turbulent flows play an important role in many aspects of nature and technics from sea storms to transport of particles or chemicals. Transport of energy from large scales to small fluctuations is the essential feature of three-dimensional turbulence. What mechanism is responsible for this transport and how do the small fluctuations appear? The conventional conception implies a cascade of breaking vortices. But it faces crucial problems in explaining the mechanism of the breaking, and fails to explain the observed long-living structures in turbulent flows.

We suggest a new concept based on recent analysis of stochastic Navier-Stokes equation: stretching of vortices instead of their breaking may be the main mechanism of turbulence. This conception is free of the disadvantages of the cascade paradigm; it also does not need finite-time singularities to explain the observed statistical properties of turbulent flows. Moreover, the introduction of the new conception allows to get velocity scaling parameters well consistent with experimental data.

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