

UNIVERSITÀ DEGLI STUDI DI GENOVA

Dottorato in Fluidodinamica e Processi dell'Ingegneria Ambientale
Progetto Marie Curie EST "FLUBIO"

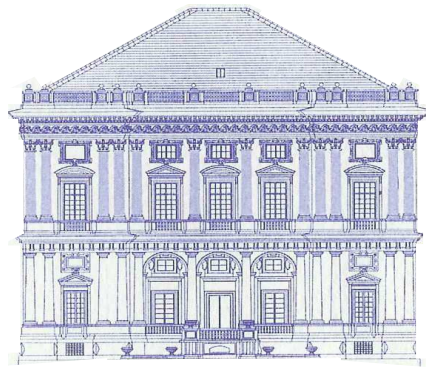
AVVISO DI SEMINARIO

"RENORMALIZED TRANSPORT OF INERTIAL PARTICLES"

Dr. Marco Martins Afonso

Institut de Mécanique des Fluides de Toulouse
France

Lunedì 14 Settembre, 2009 – ore 14.30
Facoltà di Ingegneria
Aula A6
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Renormalized transport of inertial particles

We study how an imposed flow (laminar or turbulent) modifies the transport properties of inertial particles, namely their terminal velocity and effective diffusivity. Such quantities are investigated by means of analytical and numerical computations, as functions of the control parameters of both flow and particle, i.e., density ratio, inertia, molecular diffusivity, gravity (or other external forces), turbulence intensity, compressibility degree, space dimension, and geometric\temporal properties. The complex interplay between these parameters leads to the following conclusion of interest in the realm of applications: any attempt to model sedimentation processes (or, equivalently, the surface transport of floaters) cannot avoid taking into account the full details of the flow field and of the inertial particle.

Biographical sketch of Marco Martins Afonso

Marco Martins Afonso obtained a Ph.D. in Physics at the University of Genova in 2006, under the supervision of Roberto Festa and Andrea Mazzino. His main focus was on turbulent flows, in particular on mixing and LES of tracers; he also investigated some aspects of Kolmogorov's 4/5 law and the evolution of polymeric molecules in random velocity fields, and he started his (still ongoing) long-term research project on the flow-induced renormalization of inertial-particle transport. He then served as post-doc in Israel, at the Weizmann Institute of Science in Rehovot (in the group of Gregory Falkovich), and in the US, at the Johns Hopkins University in Baltimore (in the group of Charles Meneveau): he analyzed the statistical properties of fluid-particle separation and velocity gradient tensor. Currently he is a post-doc at the Institut de Mécanique des Fluides de Toulouse (France), in the group of Olivier Simonin, and he is investigating the role of turbulence on biological systems. He is the author or co-author of 12 articles published on international peer-reviewed journals, and of 6 papers appeared in conference proceedings.