1. Record Nr. UNISA996466690803316

Titolo	Interdisciplinary Aspects of Turbulence [[electronic resource] /] / edited by Wolfgang Hillebrandt, Friedrich Kupka
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2009
ISBN	3-540-78961-8
Edizione	[1st ed. 2009.]
Descrizione fisica	1 online resource (345 p.)
Collana	Lecture Notes in Physics, , 0075-8450 ; ; 756
Disciplina	523.01 530 532 533.62
Soggetti	Statistical physics Dynamical systems Fluids Astrophysics Fluid mechanics Atmospheric sciences Complex Systems Fluid- and Aerodynamics Astrophysics and Astroparticles Engineering Fluid Dynamics Atmospheric Sciences Statistical Physics and Dynamical Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	An Introduction to Turbulence -- Nonextensive Statistical Mechanics and Nonlinear Dynamics -- Turbulent Convection and Numerical Simulations in Solar and Stellar Astrophysics -- Turbulence in Astrophysical and Geophysical Flows -- Turbulence in the Lower Troposphere: Second-Order Closure and Mass#x2013;Flux Modelling Frameworks -- Magnetohydrodynamic Turbulence -- Turbulent Combustion in Thermonuclear Supernovae -- ODT: Stochastic

Simulation of Multi-scale Dynamics.

Sommario/riassunto

What do combustion engines, fusion reactors, weather forecast, ocean flows, our sun, and stellar explosions in outer space have in common? Of course, the physics and the length and time scales are vastly different in all cases, but it is also well known that in all of them, on some relevant length scales, the material flows that govern the dynamical and/or secular evolution of the systems are chaotic and often unpredictable: they are said to be turbulent. The interdisciplinary aspects of turbulence are brought together in this volume containing chapters written by experts from very different fields, including geophysics, astrophysics, and engineering. It covers several subjects on which considerable progress was made during the last decades, from questions concerning the very nature of turbulence to some practical applications. These subjects include: a basic introduction into turbulence, statistical mechanics and nonlinear dynamics, turbulent convection in stars, atmospheric turbulence in the context of numerical weather predictions, magnetohydrodynamic turbulence, turbulent combustion with application to supernova explosions, and finally the numerical treatment of the multi-scale character of turbulence.