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	Titolo	A companion to Persius and Juvenal / edited by Susanna Braund and Josiah Osgood
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2.	Record Nr.	UNINA9910410001303321
	Autore	Kato Shoji
	Titolo	Fundamentals of Astrophysical Fluid Dynamics : Hydrodynamics, Magnetohydrodynamics, and Radiation Hydrodynamics // by Shoji Kato, Jun Fukue
	Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2020
	ISBN	981-15-4174-4
	Edizione	[1st ed. 2020.]
	Descrizione fisica	1 online resource (xxiv, 625 pages) : illustrations
	Collana	Astronomy and Astrophysics Library, , 2196-9698
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	Soggetti	Astrophysics Continuum mechanics Plasma (Ionized gases) Gravitation Cosmology Solar system Continuum Mechanics Plasma Physics Classical and Quantum Gravity Space Physics

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Nota di contenuto	<p>1 Introduction -- Part I Hydrodynamical Phenomena in Astrophysical Objects -- 2 Basic Equations for Hydrodynamics -- 3 Astrophysical Fluid Flows -- 4 Wave Phenomena in Astrophysical Objects -- 5 Convection and Related Topics -- 6 Dynamical Instability and Dynamical Excitation of Oscillations -- 7 Instabilities due to Dissipative Processes I (Secular Instability) -- 8 Overstability due to Dissipative Processes II: Excitation of Oscillations -- 9 General Relativistic Hydrodynamics -- Part II Magnetohydrodynamical Phenomena in Astrophysical Objects -- 10 Derivation of Magnetohydrodynamical Equations from Boltzmann Equation -- 11 MHD Equations and Basic Characteristics of Magnetic Fields -- 12 Astrophysical MHD Flows -- 13 Waves and Shocks in Magnetohydrodynamical Fluids -- 14 Astrophysical Dynamo -- 15 General Stability Theorem for MHD Systems -- 16 Instabilities Related to Magnetic Fields -- 17 Important Non-Ideal MHD Processes -- 18 Relativistic Magnetohydrodynamics -- Part III Astrophysical RadiationHydrodynamics -- 19 Basic Concepts of Radiative Fluids -- 20 Basic Equations for Radiative Transfer -- 21 Basic Equations for Radiation Hydrodynamics -- 22 Astrophysical RHD Flows -- 23 Wave and Instability in Radiative Fluids -- 24 Relativistic Radiative Transfer -- 25 Relativistic Radiation Hydrodynamics -- 26 General Relativistic Radiation Hydrodynamics.</p>
Sommario/riassunto	<p>This book offers an overview of the fundamental dynamical processes, which are necessary to understand astrophysical phenomena, from the viewpoint of hydrodynamics, magnetohydrodynamics, and radiation hydrodynamics. The book consists of three parts: The first discusses the fundamentals of hydrodynamics necessary to understand the dynamics of astrophysical objects such as stars, interstellar gases and accretion disks. The second part reviews the interactions between gases and magnetic fields on fluid motions – the magnetohydrodynamics – highlighting the important role of magnetic fields in dynamical phenomena under astrophysical environments. The third part focuses on radiation hydrodynamics, introducing the hydrodynamic phenomena characterized by the coupling of radiation and gas motions and further on relativistic radiation hydrodynamics. Intended as a pedagogical introduction for advanced undergraduate and graduate students, it also provides comprehensive coverage of the fundamentals of astrophysical fluid dynamics, making it an effective resource not only for graduate courses, but also for beginners wanting to learn about hydrodynamics, magnetohydrodynamics, and radiation hydrodynamics in astrophysics independently.</p>