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Sommario/riassunto

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.
