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Nota di contenuto	1 Fundamental concepts associated with Magnetic Reconnection; W.D. Gonzalez, et al.- 2 Collisionless Reconnection and Electron Demagnetization; J. Scudder, et al -- 3 MHD structures in 3D Reconnection; E. Priest -- 4 Energy Conversion during Reconnection; M. Yamada, et al -- 5 Rapid Reconnection and Magnetic Field Topology; E. N. Parker, A. F. Rappazzo -- 6 Magnetospheric Dayside Reconnection; P. Cassak, S. Fuselier -- 7 Magnetospheric Tail Reconnection; A. Petrukovich, et al -- 8 Magnetospheric Separatrices: Theory and Observations; G. Lapenta, et al -- 9 Comparative Reconnection in Planetary Systems; R. J. Walker, X. Jia -- 10 Fractal Reconnection in Solar and Stellar Environments; K. Shibata, S.Takasao -- 11 Turbulent Reconnection in Astrophysical Systems; A. Lazarian, et al -- 12 Radiative Reconnection in Astrophysics; D. Uzdensky.- 13 Annihilation of Quantum Magnetic Fluxes; W. D. Gonzalez. .

Sommario/riassunto

This book provides an overview of recent research highlights in the main areas of application of magnetic reconnection (MR), including planetary, solar and magnetospheric physics and astrophysics. It describes how research on magnetic reconnection, especially concerning the Earth's magnetosphere, has grown extensively due to dedicated observations from major satellite missions such as Cluster, Double Star and Themis. The accumulated observations from these missions are being supplemented by many theoretical and modelling efforts, for which large scale computer facilities are successfully being used, and the theoretical advances are also covered in detail. Opening with an introductory discussion of some fundamental issues related to magnetic reconnection, subsequent chapters address topics including collisionless magnetic reconnection, MHD structures in 3D reconnection, energy conversion processes, fast reconnection mediated by plasmoids, rapid reconnection and magnetic field topology. Further chapters consider specific areas of application such as magnetospheric dayside and tail reconnection, comparative reconnection in planetary systems and reconnection in astrophysical systems. The book offers insight into discussions about fundamental concepts and key aspects of MR, access to the full set of applications of MR as presently known in space physics and in astrophysics, and an introduction to a new related area of study dealing with the annihilation of quantum magnetic fluxes and its implications in the study on neutron star activity. The book is aimed primarily at students entering the field, but will also serve as a useful reference text for established scientists and senior researchers. .