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| Nota di contenuto | The Magnetic Universe Geophysical and Astrophysical Dynamo Theory; Contents; Preface; 1 Introduction; 2 Earth and Planets; 2.1 Observational Overview; 2.1.1 Reversals; 2.1.2 Other Time-Variability; 2.2 Basic Equations and Parameters; 2.2.1 Anelastic and Boussinesq Equations; 2.2.2 Nondimensionalization; 2.3 Magnetoconvection; 2.3.1 Rotation or Magnetism Alone; 2.3.2 Rotation and Magnetism Together; 2.3.3 Weak versus Strong Fields; 2.3.4 Oscillatory Convection Modes; 2.4 Taylor's Constraint; 2.4.1 Taylor's Original Analysis; 2.4.2 Relaxation of $Ro = E = 0$ 2.4.3 Taylor States versus Ekman States2.4.4 From Ekman States to Taylor States; 2.4.5 Torsional Oscillations; 2.4.6 -Dynamics; 2.4.7 Taylor's Constraint in the Anelastic Approximation; 2.5 Hydromagnetic Waves; 2.6 The Inner Core; 2.6.1 Stewartson Layers on C; 2.6.2 Nonaxisymmetric Shear Layers on C; 2.6.3 Finite Conductivity of the Inner Core; 2.6.4 Rotation of the Inner Core; 2.7 Numerical Simulations; 2.8 Magnetic Instabilities; 2.9 Other Planets; 2.9.1 Mercury, Venus and |

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5.2 Stability of Differential Rotation in Hydrodynamics

Sommario/riassunto

Magnetism is one of the most pervasive features of the Universe, with planets, stars and entire galaxies all having associated magnetic fields. All of these fields are generated by the motion of electrically conducting fluids, the so-called dynamo effect. The precise details of what drives the motion, and indeed what the fluid consists of, differ widely though. In this work the authors draw upon their expertise in geophysical and astrophysical MHD to explore some of these phenomena, and describe the similarities and differences between different magnetized objects. They also explain why magn
