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Autore	Cheng Ta-Pei
Titolo	A College Course on Relativity and Cosmology [[electronic resource]]
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Nota di contenuto	Cover; Preface; Contents; 1 Introduction; 1.1 Relativity as a coordinate symmetry; 1.1.1 Coordinate transformations; 1.1.2 The principle of relativity; 1.2 Einstein and relativity; 1.2.1 The new kinematics; 1.2.2 GR as a field theory of gravitation; Review questions; 2 Special Relativity: The New Kinematics; 2.1 Einstein's two postulates and Lorentz transformation; 2.1.1 Relativity of simultaneity and the new conception of time; 2.1.2 Coordinate-dependent time leads to Lorentz transformation; 2.2 Physics implications of Lorentz transformation; 2.2.1 Time dilation and length contraction 2.2.2 The invariant interval and proper time2.3 Two counterintuitive scenarios as paradoxes; Review questions; 3 Special Relativity: Flat Spacetime; 3.1 Geometric formulation of relativity; 3.2 Tensors in special relativity; 3.2.1 Generalized coordinates: bases and the metric; 3.2.2 Velocity and momentum 4-vectors; 3.2.3 Electromagnetic field 4-tensor; 3.2.4 The energy-momentum-stress 4-tensor for a field

Sommario/riassunto

This advanced undergraduate text introduces Einstein's general theory of relativity. The topics covered include geometric formulation of special relativity, the principle of equivalence, Einstein's field equation and its spherical-symmetric solution, as well as cosmology. An emphasis is placed on physical examples and simple applications without the full tensor apparatus. It begins by examining the physics of the equivalence principle and looks at how it inspiredEinstein's idea of curved spacetime as the gravitational field. At a more mathematically accessible level, it provides a metric descr