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Nota di contenuto	Cover; Contents; 1 Origin and significance of Special Relativity; 2 Historical developments; 2.1 The dualistic concept of matter in the 19th century; 2.2 The principle of relativity in mechanics; 2.3 Is the relativity principle valid in electrodynamics?; 2.4 Experiments, contradictions, and consequences; 2.4.1 Aberration; 2.4.2 Fizeau's experiment; 2.4.3 The Michelson-Morley experiment; 2.4.4 The FitzGerald-Lorentz deformation hypothesis; 3 Foundations of Special Relativity; 3.1 The notion of simultaneity; 3.2 Lorentz transformations; 3.3 Time dilation and length contraction 3.3.1 Time dilation3.3.2 Length contraction; 3.4 Addition of velocities; 3.5 Causality relations; 3.6 Aberration and Doppler effect; 3.6.1 Aberration; 3.6.2 Doppler effect; 3.7 Length contraction and visual appearance; 3.8 Mass, momentum, and kinetic energy; 3.9 Probably the most famous formula in all of physics; 3.10 Electrodynamics: Invariance of Maxwell's equations; 4 Further consequences and applications of Special Relativity; 4.1 Atomic physics; 4.2 Nuclear physics; 4.3 Elementary particle physics; 4.4 Daily physics: navigational systems;

4.5 Science fiction: travel to distant stars?

4.6 Outlook on General Relativity5 Closer encounters with special topics; 5.1 Ole Rømer's measurement of the velocity of light; 5.2 The independence of the velocity of light from the state of motion of the source; 5.3 Do superluminal velocities exist?; 5.4 The Kennedy-Thorndike experiment; 5.5 The Ives-Stilwell experiment; 5.6 The current experimental status of Special Relativity; 5.7 Synchronization by slow clock-transport; 5.8 Aberration and conformal transformations; 5.9 Transformation formulae for momentum, energy, and force; 5.10 Minkowski space and the Lorentz group; Bibliography GlossarySymbols, units, constants; Picture Credits; Index; A; B; C; D; E; F; G; H; I; J; K; L; M; N; O; P; Q; R; S; T; U; V; W; Y; Z

Sommario/riassunto

Special relativity provides the foundations of our knowledge of space and time. Without it, our understanding of the world, and its place in the universe, would be unthinkable. This book gives a concise, elementary, yet exceptionally modern, introduction to special relativity. It is a gentle yet serious 'first encounter', in that it conveys a true understanding rather than purely reports the basic facts. Only very elementary mathematical knowledge is needed to master it (basichigh-school maths), yet it will leave the reader with a sound understanding of the subject. Special Relativity: A First