

1. Record Nr.	UNINA9910146577603321
Titolo	Special relativity : will it survive the next 101 years? // Jurgen Ehlers, Claus Lammerzahl (editors)
Pubbl/distr/stampa	Berlin ; ; Heidelberg : , : Springer, , [2006] ©2006
ISBN	1-280-62738-7 9786610627387 3-540-34523-X
Edizione	[1st ed. 2006.]
Descrizione fisica	1 online resource (541 p.)
Collana	Lecture notes in physics ; ; 702
Disciplina	530.11
Soggetti	Special relativity (Physics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Lectures presented at the 271st WE-Heraeus Seminar, held Feb. 13-18, 2005, in Potsdam, Germany.
Nota di contenuto	Historical and Philosophical Aspects -- Isotropy of Inertia: A Sensitive Early Experimental Test -- The Challenge of Practice: Einstein, Technological Development and Conceptual Innovation -- Foundation and Formalism -- Foundations of Special Relativity Theory -- Algebraic and Geometric Structures in Special Relativity -- Quantum Theory in Accelerated Frames of Reference -- Vacuum Fluctuations, Geometric Modular Action and Relativistic Quantum Information Theory -- Spacetime Metric from Local and Linear Electrodynamics: A New Axiomatic Scheme -- Violations of Lorentz Invariance? -- Overview of the Standard Model Extension: Implications and Phenomenology of Lorentz Violation -- Anything Beyond Special Relativity? -- Doubly Special Relativity as a Limit of Gravity -- Corrections to Flat-Space Particle Dynamics Arising from Space Granularity -- Experimental Search -- Test Theories for Lorentz Invariance -- Test of Lorentz Invariance Using a Continuously Rotating Optical Resonator -- A Precision Test of the Isotropy of the Speed of Light Using Rotating Cryogenic Optical Cavities -- Rotating Resonator-Oscillator Experiments to Test Lorentz Invariance in Electrodynamics -- Recent Experimental Tests of Special Relativity -- Experimental Test of Time Dilation by Laser Spectroscopy on Fast Ion Beams -- Tests of Lorentz

Symmetry in the Spin-Coupling Sector -- Do Evanescent Modes Violate Relativistic Causality?.

Sommario/riassunto

After a century of successes, physicists still feel the need to probe the limits of the validity of theories based on special relativity. Canonical approaches to quantum gravity, non-commutative geometry, string theory and unification scenarios predict tiny violations of Lorentz invariance at high energies. The present book, based on a recent seminar devoted to such frontier problems, contains reviews of the foundations of special relativity and the implications of Poincaré invariance as well as comprehensive accounts of experimental results and proposed tests. The book addresses, besides researchers in the field, everyone interested in the conceptual and empirical foundations of our knowledge about space, time and matter.