

1. Record Nr.	UNINA9911010534603321
Autore	Dragon Norbert
Titolo	Geometry and Quantum Features of Special Relativity // by Norbert Dragon
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	3-031-71149-1
Edizione	[2nd ed. 2025.]
Descrizione fisica	1 online resource (300 pages)
Collana	Physics and Astronomy Series
Disciplina	530.110151
Soggetti	Special relativity (Physics) Gravitation Mathematics Mathematical physics Special Relativity Classical and Quantum Gravity Applications of Mathematics Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Structures of Spacetime -- Time and Distance -- Transformations -- Relativistic Particles -- Electrodynamics -- Classical Field Theory -- The Lorentz Group.-Hyperbolic and Spherical Geometry -- Relativistic Quantum Physics -- Scattering -- Quantum Fields -- Space Inversion, Time Reversal, Charge Conjugation -- Gauge Symmetry -- Appendix A, B, C, D -- References -- Index.
Sommario/riassunto	This second edition of "The Geometry of Special Relativity - a Concise Course" offers more than just corrections and enhancements. It includes a new chapter on four-velocities and boosts as points and straight lines of hyperbolic geometry. Quantum properties of relativistic particles are derived from the unitary representations of the Poincaré group. Notably, the massless representation is related to the concept of a Hopf bundle. Scattering theory is developed analogously to the non-relativistic case, relying on proper symmetry postulates. Chapters on quantum fields, reflections of charge, space, and time, and the necessary gauge symmetry of quantized vector fields complete the

foundation for evaluating Feynman graphs. An extended appendix covers more than a dozen additional topics. The first half of this edition refines the first edition, using simple diagrams to explain time dilation, length contraction, and Lorentz transformations based on the invariance of the speed of light. The text derives key results of relativistic physics and resolves apparent paradoxes. Following a presentation of the action principle, Noether's theorem, and relativistic mechanics, the book covers the covariant formulation of electrodynamics and classical field theory. The groups of rotations and Lorentz transformations are also examined as a transition to relativistic quantum physics. This text is aimed at graduate students of physics and mathematics seeking an advanced introduction to special relativity and related topics. Its presentation of quantum physics aims to inspire fellow researchers.
