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Titolo	A first course on symmetry, special relativity and quantum mechanics : the foundations of physics // G. Kunstatter, Saurya Das
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ISBN	3-030-92346-0
Edizione	[Second edition.]
Descrizione fisica	1 online resource (410 pages)
Collana	Undergraduate lecture notes in physics
Disciplina	530.12
Soggetti	Quantum theory Special relativity (Physics) Symmetry (Physics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction -- Symmetry and Physics -- Formal Aspects of Symmetry -- Symmetries and Linear Transformations.-Special Relativity I: The Basics.-Special Relativity II: In Depth.-General Relativity -- Introduction to the Quantum -- The Wave Function.-The Schrodinger Equation -- The Hydrogen Atom -- Nuclear Physics.-Supplementary: Advanced Topics.-Conclusion.
Sommario/riassunto	This book provides an in-depth and accessible description of special relativity and quantum mechanics which together form the foundation of 21st century physics. A novel aspect is that symmetry is given its rightful prominence as an integral part of this foundation. The book offers not only a conceptual understanding of symmetry, but also the mathematical tools necessary for quantitative analysis. As such, it provides a valuable precursor to more focused, advanced books on special relativity or quantum mechanics. Students are introduced to several topics not typically covered until much later in their education. These include space-time diagrams, the action principle, a proof of Noether's theorem, Lorentz vectors and tensors, symmetry breaking and general relativity. The book also provides extensive descriptions on topics of current general interest such as gravitational waves, cosmology, Bell's theorem, entanglement and quantum computing.

Throughout the text, every opportunity is taken to emphasize the intimate connection between physics, symmetry and mathematics. The style remains light despite the rigorous and intensive content. The book is intended as a stand-alone or supplementary physics text for a one or two semester course for students who have completed an introductory calculus course and a first-year physics course that includes Newtonian mechanics and some electrostatics. Basic knowledge of linear algebra is useful but not essential, as all requisite mathematical background is provided either in the body of the text or in the Appendices. Interspersed through the text are well over a hundred worked examples and unsolved exercises for the student.
