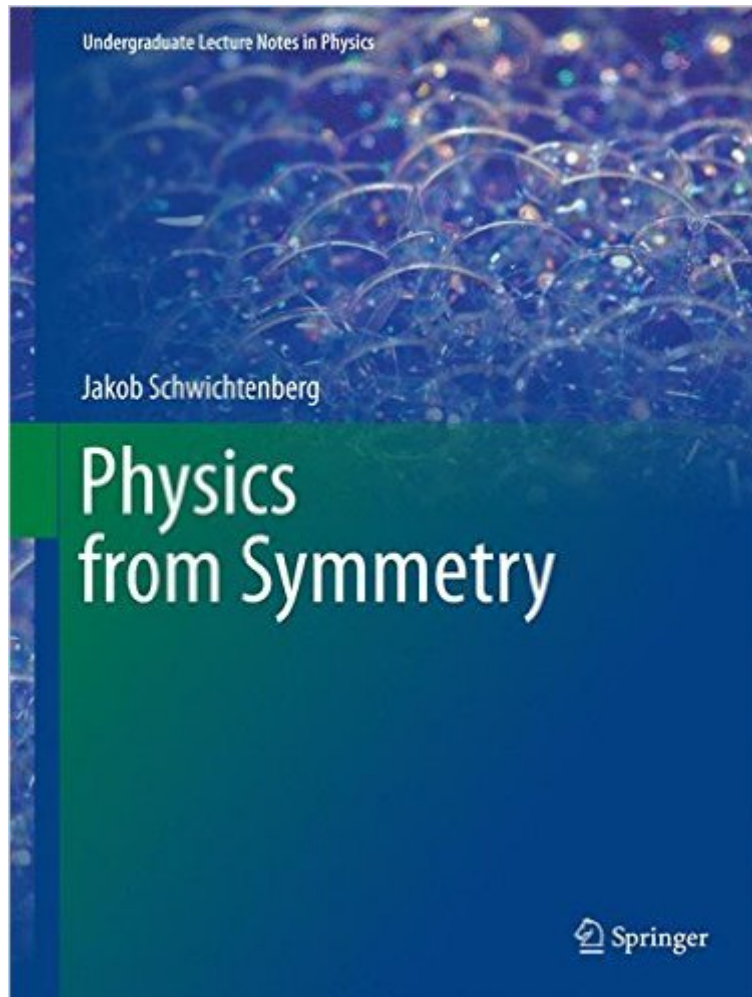


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Physics From Symmetry (Undergraduate Lecture Notes In Physics)



Synopsis

This is a textbook that derives the fundamental theories of physics from symmetry. It starts by introducing, in a completely self-contained way, all mathematical tools needed to use symmetry ideas in physics. Thereafter, these tools are put into action and by using symmetry constraints, the fundamental equations of Quantum Mechanics, Quantum Field Theory, Electromagnetism, and Classical Mechanics are derived. As a result, the reader is able to understand the basic assumptions behind, and the connections between the modern theories of physics. The book concludes with first applications of the previously derived equations.

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Customer Reviews

Undergraduates, today and in the future, are so lucky to have this book. It's the book I wish I had as an undergraduate, it would have saved a lot of time and misplaced effort. Future undergraduates will not have to experience the frustration of trawling through various dense texts, on topics within this new book, but were written for a much more advanced reader. The book's author has done a great job of defining the mathematical tools and drawing together the various strands using symmetry ideas in an almost conversational style but without any loss of rigor. Jakob has a wonderful way of describing and simplifying a seemingly complex notion, although that will be of no surprise to those who follow his mathematics and physics blog at jakobschwichtenberg.com. Once a reader has read, and studied, the book they will be in the fantastic position of being able to read and

understand some of the higher level texts and science papers on topics that follow on from the book. This new text is easily the best book on, symmetry and physics, at this level; in fact I think it's the best book on any topic at undergraduate level period! Jakob should be rightly proud in producing such an excellent book at his first attempt. I'm really looking forward to see what he produces in the future.

This is the book I've been looking for all these years - a clear, concise, well-written summary, from an introductory level, of advanced (for me, at least) physics topics connected by the common thread of symmetry. More specifically, the introductory presentation of symmetry and Lie Groups makes this ordinarily complex topic clear and understandable! I also appreciate the level of presentation - no boring topics such as ropes and pulleys, inclined planes with sliding boxes, etc., no historical fluff and filler (that made me change from physics to chemistry); the chapters start with the really interesting stuff: Special Relativity; Symmetry Tools; Lagrangian Formalism; Classical Mechanics; Electrodynamics; Noether's Theorem; QM Operators; Klein-Gordon & Dirac Equations; Symmetry of Spin Fields; Schrodinger Eq; and Quantum Field Theory. Plus an Appendix reviewing Calculus and Linear Algebra. The book contains much more than these topics, but this gives an indication of the level and scope involved. Overall, an excellent, almost magical, text covering all the major areas of physics in an accessible manner. Highly recommended!

I've read this book in preparation for my bachelors theo. physics exam, mainly because I had no clue concerning Lie-Theory and most other books were overly formal and complicated. This book gives very easy and intuitive access to the main idea of group theory with very little assumptions made and knowledge required. I quite enjoyed the way this book was written, so I kept reading the following chapters, even if they weren't necessarily relevant for my exam (Theory of relativity) or I've already learnt those topics (Quantum mechanics) and it was worth it, because the book offers some nice connections between Lagrangian- and Quantum Physics using symmetric deliberation. That said, one must notice that this book is kept as compact as possible (which is prob. necessary since it covers and connects so many topics) and is thus no complete coverage of each particular topic on its own. If you have an exam about only Quantum Physics next week and only time to read one book, you prob. should better read a standard textbook, but if you are looking for a deeper understanding and the link between things, or if you just started your studies and want an intuitive introduction into the world of physics using Symmetry - this is the perfect book for you.

Although I applaud the general intent of this book, the result is of such erratic quality that I simply cannot recommend it. First off, the book is packed with typos and errors. It doesn't appear to have been proof-read by any competent reviewer. Then, the author has adopted a great deal of idiosyncratic notation, offered without clear explanation, and not used in a consistent manner. And most damaging, the book fails to clearly separate discussion of Lie Groups from the discussion of Lie Algebras. The two concepts are defined but then completely blurred in the subsequent text. The discussion is heavy on manual derivations of commutation relations and representations - which is good to see. But all that has been done more clearly and efficiently many times over the past 125 years.

This book should be a must for every science and math undergraduate. It is the right way to introduce physics to young students and a significant improvement on the way in which undergraduate courses started with classical physics. The beauty of the subject is made obvious and the built up of the field of physics is clearly illustrated; without compromising on the maths. The structure of the book is well thought through and the student is helped a lot by the diagrams and the summaries at the start of each part . The math required is explained in the appendices just at the right level and with the same clarity as we find in the bulk of the book . I do agree that there are typos, for which the author has created an errata webpage . Possibly some details can be improved, but I would recommend this book to anybody. I look forward to see the 2nd edition!

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