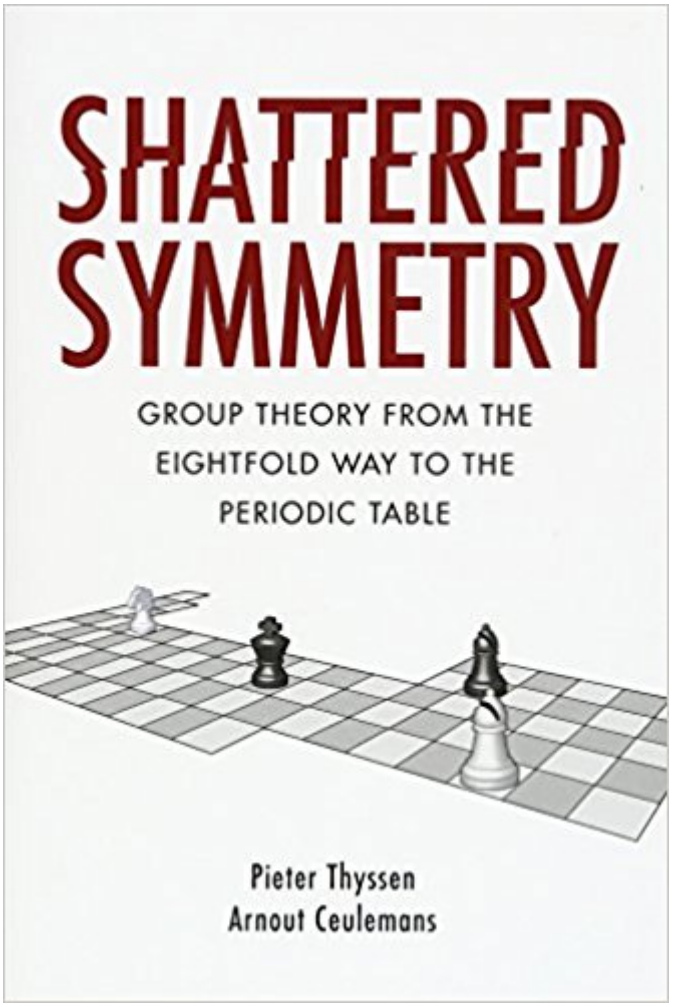
Shattered Symmetry: Group Theory From The Eightfold Way To The Periodic Table



Synopsis

Symmetry is at the heart of our understanding of matter. This book tells the fascinating story of the constituents of matter from a common symmetry perspective. The standard model of elementary particles and the periodic table of chemical elements have the common goal to bring order in the bewildering chaos of the constituents of matter. Their success relies on the presence of fundamental symmetries in their core.The purpose of Shattered Symmetry is to share the admiration for the power and the beauty of these symmetries. The reader is taken on a journey from the basic geometric symmetry group of a circle to the sublime dynamic symmetries that govern the motions of the particles. Along the way the theory of symmetry groups is gradually introduced with special emphasis on its use as a classification tool and its graphical representations. This is applied to the unitary symmetry of the eightfold way of quarks, and to the four-dimensional symmetry of the hydrogen atom. The final challenge is to open up the structure of Mendeleev's table which goes beyond the symmetry of the hydrogen atom. Breaking this symmetry to accommodate the multi-electron atoms requires us to leave the common ground of linear algebras and explore the potential of non-linearity.

Book Information

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Customer Reviews

Pieter Thyssen is a Postdoctoral Researcher at the Catholic University of Leuven. He completed his PhD in Theoretical Chemistry in 2013, and is currently working on a second PhD in the Philosophy and Foundations of Physics.Arnout Ceulemans is Professor of Theoretical Chemistry at the Catholic

University of Leuven. His research is devoted to the development and application of group theory and topology to chemistry.

Excellent introduction to the topic. Gradual build up from basics to a more profound elaboration.

Shattered Symmetry: Group Theory From the Eightfold Way to the Periodic Table Symmetry Rules: How Science and Nature Are Founded on Symmetry (The Frontiers Collection) Molecular Symmetry and Group Theory : A Programmed Introduction to Chemical Applications, 2nd Edition Symmetry: An Introduction to Group Theory and Its Applications (Dover Books on Physics) Symmetry, Group Theory, and the Physical Properties of Crystals (Lecture Notes in Physics) Symmetry and Structure: Readable Group Theory for Chemists Molecular Symmetry and Group Theory Molecular Symmetry and Group Theory: A Programmed Introduction to Chemical Applications Molecular Symmetry and Group Theory: A Programmed Introduction to Chemical Application Memorize the Periodic Table: The Fast and Easy Way to Memorize Chemical Elements The Mathematical Theory of Symmetry in Solids: Representation Theory for Point Groups and Space Groups (Oxford Classic Texts in the Physical Sciences) International Tables for Crystallography, Space-Group Symmetry (IUCr Series. International Tables of Crystallography) Joining Together: Group Theory and Group Skills (11th Edition) The Genesis of the Abstract Group Concept: A Contribution to the History of the Origin of Abstract Group Theory (Dover Books on Mathematics) The Art of the Table: A Complete Guide to Table Setting, Table Manners, and Tableware Pivot Tables: Pivot Table Basics, Pivot Table Essentials, Data Crunching, Master Pivot Tables, Learn Pivot Tables. Pivot Table Tricks, Tips, Secrets, Shortcuts, Made Easy, Pivot Tables for Beginners The Periodic Table Periodic Table Basic (Quickstudy: Academic) The Elements Book: A Visual Encyclopedia of the Periodic Table Photographic Card Deck of The Elements: With Big Beautiful Photographs of All 118 Elements in the Periodic Table