1. Record Nr. UNINA9910789212503321

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| Titolo | Group Theory and Its Applications in Physics [[electronic resource] /] / by Teturo Inui, Yukito Tanabe, Yositaka Onodera |
| Pubbl/distr/stampa | Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 1990 |
| ISBN | 3-642-80021-1 |
| Edizione | [1st ed. 1990.] |
| Descrizione fisica | 1 online resource (XV, 397 p.) |
| Collana | Springer Series in Solid-State Sciences, , 0171-1873 ; ; 78 |
| Disciplina | 530.1/522 |
| Soggetti | Physics<br>Crystallography<br>Atoms<br>Mathematical Methods in Physics<br>Numerical and Computational Physics, Simulation<br>Crystallography and Scattering Methods<br>Atomic, Molecular, Optical and Plasma Physics |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | "With 72 Figures." |
| Nota di bibliografia | Includes bibliographical references and index. |
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Sommario/riassunto

This book has been written to introduce readers to group theory and its ap- plications in atomic physics, molecular physics, and solid-state physics. The first Japanese edition was published in 1976. The present English edi- tion has been translated by the authors from the revised and enlarged edition of 1980. In translation, slight modifications have been made in. Chaps. 8 and 14 to update and condense the contents, together with some minor additions and improvements throughout the volume. The authors cordially thank Professor J. L. Birman and Professor M. Car- dona, who encouraged them to prepare the English translation. Tokyo, January 1990 T. Inui . Y. Tanabe Y. Onodera Preface to the Japanese Edition As the title shows, this book has been prepared as a textbook to introduce readers to the applications of group theory in several fields of physics. Group theory is, in a nutshell, the mathematics of symmetry. It has three main areas of application in modern physics. The first originates from early studies of crystal morphology and constitutes a framework for classical crystal physics. The analysis of the symmetry of tensors representing macroscopic physical properties (such as elastic constants) belongs to this category. The sec- ond area was enunciated by E. Wigner (1926) as a powerful means of handling quantum-mechanical problems and was first applied in this sense to the analysis of atomic spectra. Soon, H.