

Foreword to the first edition

A new generation of books on group theory for physicists has appeared over the last ten years. Many of them deal only with elementary particle physics or with condensed matter physics. This volume by Prof. Jin-Quan Chen is a serious attempt to cover a broad range of applications of group theory to physics. It begins with an introduction to the elements of group theory and the theory of representations. Representations of finite groups and character theory are carefully treated and applied in later chapters to point groups and space groups, where thorough and practical information is given about molecular and crystal groups.

The permutation group is discussed in detail, and its use in finding the irreducible representations of unitary groups is carefully and completely covered. Lie groups and Lie algebras are treated sufficiently to enable their use in elementary particle physics, with a thorough presentation of Dynkin diagrams and the reduction of products.

For spectroscopy and, in particular, nuclear spectroscopy, this is the first up-to-date and thorough treatment of the calculation of isoscalar factors and coefficients of fractional parentage. There are extensive tables and indications of computational methods.

With his collaborators in Nanjing and Philadelphia, Chen has contributed extensively to new developments over the past decade. These researches are incorporated into the present book, of which a preliminary version was published a few years ago in the People's Republic of China.

It has been a pleasure for me to talk with Chen many times about group theory and a special pleasure to welcome the appearance of this book.

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