1. Record Nr. UNINA9910155108703321

Autore	Kota V. K. B.
Titolo	Structure of medium mass nuclei : deformed shell model and spin-isospin interacting boson model / / by V K B Kota and R Sahu
Pubbl/distr/stampa	Boca Raton, FL : , : CRC Press, an imprint of Taylor and Francis, , [2016] ©2017
ISBN	1-351-73693-0 1-315-18638-1 1-351-73694-9
Descrizione fisica	1 online resource (321 pages) : illustrations
Disciplina	539.7/43
Soggetti	Nuclear structure Nuclear excitation Nuclear models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Half Title -- Title Page -- Copyright Page -- Dedication -- Table of Contents -- Preface -- 1: Introduction -- 2: Deformed shell model -- 2.1 Introduction -- 2.2 HartreeFock method -- 2.3 Angular momentum projection -- 2.4 Matrix elements of a tensor operator -- 2.5 Matrix elements of the Hamiltonian matrix -- 2.6 Orthonormalization and band mixing -- 2.7 Matrix elements of E2 and M1 transition operators -- 2.8 Summary -- 3: DSM results for spectroscopy of Ge, Se, Br, Kr, and Sr isotopes -- 3.1 Structure of collective bands and triple forking in 68Ge -- 3.2 Shape coexistence and role of 1g9/2 orbit in Se isotopes -- 3.3 Band structures and 3qp bands in 77,79,81Br isotopes -- 3.4 Collective bands and yrast band alignments in 78Kr -- 3.5 Identical bands and collectivity in 77,79Sr -- 3.6 Summary -- 4: Applications of DSM to GT distributions, muon-electron conversion, and dark matter -- 4.1 GT distributions in Ge, Se, Kr, and Sr isotopes -- 4.2 Transition matrix elements for - e conversion in 72Ge -- 4.3 DSM application to dark matter: Elastic scattering of LSP from 73Ge -- 4.4 Summary -- 5: DSM results for double beta decay in A60-90 nuclei -- 5.1 Introduction -- 5.2 Half-

lives and nuclear structure matrix elements for double beta decay -- 5.3 DSM results for two neutrino positron double beta decay -- 5.4 DSM results for two neutrino double beta decay -- 5.5 DSM results for 0?DBD and 0? e+DBD -- 5.6 Shape effects on double beta decay matrix elements -- 5.7 Summary -- 6: Heavy NZ nuclei: SU(4) structure, Wigner energy, and pn pairing -- 6.1 Introduction -- 6.2 Spinisospin SU(4) algebra in shell model -- 6.3 Double binding energy differences and SU(4) symmetry -- 6.4 Wigner energy, SU(4) symmetry and T 0 and T 1 states in NZ odd-odd nuclei -- 6.5 Isoscalar and isovector pairing in NZ nuclei and new structures due to pn pairing -- 6.6 SO(5) isovector pairing model in j - j coupling -- 6.7 Summary -- 7: Shell model SO(8) pairing algebra and Dyson mapping to IBM-ST -- 7.1 SO (8) pairing model and its three symmetry limits -- 7.2 Shell model complimentary subalgebra I -- 7.3 Shell model complimentary subalgebra II -- 7.4 Shell model complimentary subalgebra III -- 7.5 Applications of SO(8) model -- 7.6 Dyson boson mapping of SO(8) model to spinisospin interacting boson model -- 7.7 Summary -- 8: Spinisospin interacting boson model (sdIBM-ST) -- 8.1 Introduction to interacting boson model (IBM).
8.2 sdIBM-ST model and its symmetry limits -- 8.3 Transformation brackets between U(n) U(na) U(nb) SO(na) SO(nb) and U(n) SO(n) SO (na) SO(nb) chains -- 8.4 Usd(6) UST (6) limit chains -- 8.5 SOsdST (36) SOsST (6) SOdST (30) limit -- 8.6 Simple applications of SOsdST (36) SOsST (6) SOdST (30) limit -- 8.7 Summary -- 9: sdIBM-ST applications with competition between T 0 and T 1 pairing -- 9.1 Number of T 0 pairs in heavy NZ nuclei -- 9.2 Deuteron transfer in heavy NZ nuclei -- 9.3 GT strengths in heavy NZ nuclei -- 9.4 a-transfer strengths -- 9.5 Summary -- 10: Interacting boson model with isospin (sdIBM-T) -- 10.1 Dynamical symmetries of sdIBM-T: General classification -- 10.2 Symmetry limits with good s and d boson isospins -- 10.3 Symmetry limits with U(18). U(6) SUT (3) algebra -- 10.4 IBM-T investigations by Elliott and others : A summary -- 10.5 Summary -- 11: Spectroscopy of heavy N ~ Z nuclei: Results from DSM, IBM, and other models -- 11.1 Introduction -- 11.2 Heavy NZ odd-odd nuclei in DSM and other models -- 11.3 Structure of heavy even-even NZ nuclei: 64Ge to 92Pd and results from various models -- 11.4 Summary -- 12: Future outlook -- Appendix A: DSM with three-body interactions -- A.1 HF approximation with a three-body interaction -- Appendix B: U(n) and SO(n) algebras and other group theoretical aspects -- B.1 U(n) algebra -- B.2 SO(n) algebra -- B.3 Other Lie algebras -- B.4 Kronecker products -- Appendix C: Subalgebras, irrep reductions, and SO(n) and SU(3) examples in nuclei -- C.1 General principles for generating group-subgroup chains -- C.2 Irrep reductions: Some general rules -- C.3 Further examples for irrep reductions -- C.4 U(n) SO(n) example for boson systems -- C.5 U((? + 1)(? + 2)/2) SU(3) SO(3) example -- Appendix D :Isospin projection for 3, 4, 5, and 6 particles -- D.1 Isospin projection for 3 particles -- D.2 Isospin projection for 4 particles -- D.3 Isospin projection for 5 particles -- D.4 Isospin projection for 6 particles -- References -- Index.

Sommario/riassunto

Medium heavy nuclei with mass number A=60-90 exhibit a variety of complex collective properties, provide a laboratory for double beta decay studies, andare a region of all heavy N=Z nuclei. This book discusses these three aspects of nuclear structure using Deformed Shell Model and the Spin-Isospin Invariant Interacting Boson Model naturally generated by fermionic SO(8) symmetry. Using these two models, the book describes properties of medium heavy nuclei with mass number A=60-90. It provides a good reference for future nuclear structure

experiments using radioactive ion beam (RIB) facilities. Various results obtained by the authors and other research groups are also explained in this book.