

Preface
Introduction
Energy Spectrum of Many-electron Atom
Radiative and Autoionizing Transitions (Initial Formulas)
Non-relativistic atomic Hamiltonian and relativistic corrections
Relativistic atomic Hamiltonian
New wave function
Perturbation theory for the energy of an atom
Radiative and autoionizing electronic transitions
Generalized expressions for electric multipole (E_k) transition operators
Foundations of the Angular Momentum Theory
Graphical Methods
Angular momentum and tensorial algebra
Main quantities of angular momentum theory
Angular momentum theory for relativistic case
Graphical methods: their generalization for perturbation theory
Description of Complex Electronic Configurations
Non-relativistic and relativistic cases of a shell of equivalent electrons
Two and more shells of equivalent electrons
Classification of energy levels
Relations between various coupling schemes
Second-quantization in the Theory of an Atom: Quasispin and Isospin
Second-quantization and irreducible tensorial sets
Operators and matrix elements in second-quantization representation
Quasispin for a shell of equivalent electrons
Algebraic expressions for coefficients of fractional parentage (CFP)
Tensorial properties and quasispin of complex configurations
Isospin in the theory of an atom
Matrix Elements of the Energy Operator
The energy of a shell of equivalent electrons
Interaction energy of two shells in LS coupling
Semi-empirical methods of calculation of the energy spectra
Hyperfine structure of the energy spectra, isotopic and Lamb shift
Quasispin and isospin for relativistic matrix elements
Electric and Magnetic Multipole Transitions
General expressions for electric (E_k) and magnetic (M_k) multipole radiation quantities
Non relativistic matrix elements of the E_k -transitions
Relativistic matrix elements of E_k -transitions
 M_k -transitions
Particular cases of E_2 - and M_1 -transitions

Calculation of Energy Spectra and Electronic Transitions in the Case of Complex Configurations

Methods of determination of radial orbitals

Correlation effects

Perturbation theory

The role of gauge dependence, relativistic and correlation effects in electronic transitions

Peculiarities of the structure and spectra of highly ionized atoms

Global methods in the theory of many-electron atoms

Peculiarities of configurations with vacancies in inner shells

Epilogue

References

Index

Table of Contents provided by Blackwell's Book Services and R.R. Bowker. Used with permission.