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Between Coupling Schemes; 2.3 Fine Structure; Further Reading; Problems; 3 Atoms in Static Fields
 3.1 External Electric and Magnetic Fields
 3.1.1 Stark Effect; 3.1.1.1 Linear Stark Effect; 3.1.1.2 Quadratic Stark Effect; 3.1.2 Zeeman Effect;
 3.2 Hyperfine Structure; 3.2.1 Magnetic Interaction; 3.2.2 Explicit Expression for $A(I)$; 3.2.3 Hyperfine Zeeman Effect; 3.2.4 Electric Quadrupole Correction; Further Reading; Problems; 4 Atoms in AC Fields; 4.1 Applied EM Fields; 4.1.1 Radiation Hamiltonian; 4.1.2 Coulomb or Radiation Gauge; 4.2 Free-Electron Wavefunction; 4.3 Radiative Transitions; 4.3.1 One-Photon Transitions; 4.3.2 Two-Photon Transitions; 4.3.3 Transition Rate: Fermi's Golden Rule
 4.3.3.1 Degeneracy
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 5.3.1 Harmonic Approximation of $U(R)$; 5.3.2 Beyond the Harmonic Approximation of $U(R)$; 5.3.3 Vibrating Rotator; 5.3.4 Analytic Expression for $U(R)$; 5.3.5 More Accurate Techniques; 5.4 Electronic States; 5.4.1 Angular Momenta in Cylindrically Symmetric Fields; 5.4.1.1 Orbital Angular Momentum; 5.4.1.2 Spin Angular Momentum; 5.4.1.3 Multiplet Splitting; 5.4.1.4 Total Angular Momentum; 5.4.1.5 Labeling Nomenclature; 5.4.2 Angular Momenta Coupling: Hund's Cases; 5.4.2.1 Hund's Case (a); 5.4.2.2 Hund's Case (b); 5.4.2.3 Hund's Case (c); 5.4.2.4 Hund's Case (d)
 5.4.3 Molecular Symmetries: Electronic Motion

Sommario/riassunto

This book draws together the principal ideas that form the basis of atomic, molecular, and optical science and engineering. It covers the basics of atoms, diatomic molecules, atoms and molecules in static and electromagnetic fields and nonlinear optics. Exercises and bibliographies supplement each chapter, while several appendices present such important background information as physics and math definitions, atomic and molecular data, and tensor algebra. Accessible to advanced undergraduates, graduate students, or researchers who have been trained in one of the conventional curricula of phy