

Solutions to the Exercices of

C. J. Foot's Atomic Physics

Chenchao Zhao

Department of Physics, Beijing Normal University, Beijing, China

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1 Early atomic physics

Key formulas:

$$\frac{1}{\lambda} = R \left(\frac{1}{n^2} - \frac{1}{n'^2} \right) \quad (1.1)$$

$$R_H = R \frac{m_H}{m_e + m_H} \quad (1.2)$$

$$a_0 = \frac{\hbar^2}{(Ze^2/4\pi\epsilon_0)m_e} = 0.529 \times 10^{-10} \text{ m} \quad (1.3)$$

$$E = - \frac{Ze^2/4\pi\epsilon_0}{2a_0} \frac{1}{n^2} \propto Z^2 \quad (1.4)$$

$$\Delta E = \frac{\alpha^2}{n^2} E \quad (1.5)$$

$$\alpha = \frac{e^2/4\pi\epsilon_0}{\hbar c} = 1/137 \quad (1.6)$$

$$\frac{f}{c} = R_\infty ((Z - \sigma_K)^2 - (Z - \sigma_L)^2) \quad (1.7)$$

$$\rho(\omega) = \frac{\hbar\omega^3}{\pi^2 c^3} \frac{1}{\exp \hbar\omega/kT - 1} \quad (1.8)$$

$$\frac{N_2}{g_2} = \frac{N_1}{g_1} \exp \left(- \frac{\hbar\omega}{kT} \right) \quad (1.9)$$

$$P = \frac{e^2 E_0^2 \omega^4}{12\pi\epsilon_0 c^3} \quad (1.10)$$

$$\Omega_L = \frac{eB}{2m_e} \quad (1.11)$$

$$\tau = \frac{6\pi\epsilon_0 m_e c^3}{e^2 \omega^3} \quad (1.12)$$

Atomic Physics Solution Manual Foot

Fujia Yang, Joseph H. Hamilton



Atomic Physics Solution Manual Foot:

Modern Atomic and Nuclear Physics Fujia Yang, Joseph H. Hamilton, 2010 The textbook itself is the culmination of the authors many years of teaching and research in atomic physics nuclear and particle physics and modern physics It is also a crystallization of their intense passion and strong interest in the history of physics and the philosophy of science Together with the solution manual which presents solutions to many end of chapter problems in the textbook they are a valuable resource to the instructors and students working in the modern atomic field Publisher s website Fundamentals of Physics, Volume 1 David Halliday, Robert Resnick, Jearl Walker, 2021-10-05 Renowned for its interactive focus on conceptual understanding its superlative problem solving instruction and emphasis on reasoning skills the Fundamentals of Physics Volume 1 12th Edition is an industry leading resource in physics teaching With expansive insightful and accessible treatments of a wide variety of subjects including straight line motion measurement vectors and kinetic energy the book is an invaluable reference for physics educators and students In the first volume of this two volume set the authors discuss subjects including gravitation wave theory entropy and the Second Law of Thermodynamics and more Fundamentals of Physics, Extended David Halliday, Robert Resnick, Jearl Walker, 2021-10-12 Fundamentals of Physics 12th Edition guides students through the process of learning how to effectively read scientific material identify fundamental concepts reason through scientific questions and solve quantitative problems The 12th edition includes a renewed focus on several contemporary areas of research to help challenge students to recognize how scientific and engineering applications are fundamental to the world s clockwork A wide array of tools will support students active learning as they work through and engage in this course Fundamentals of Physics 12e is built to be a learning center with practice opportunities interactive challenges activities simulations and videos Practice and assessment questions are available with immediate feedback and detailed solutions to ensure that students understand the problem solving processes behind key concepts and understand their mistakes while working through problems **Fundamentals of Physics** David Halliday, Robert Resnick, Jearl Walker, 2021-10-12 Renowned for its interactive focus on conceptual understanding its superlative problem solving instruction and emphasis on reasoning skills the Fundamentals of Physics 12th Edition is an industry leading resource in physics teaching With expansive insightful and accessible treatments of a wide variety of subjects including straight line motion measurement vectors and kinetic energy the book is an invaluable reference for physics educators and students Physics for Scientists and Engineers Paul A. Tipler, Gene Mosca, 2004 This is an extensively revised edition of Paul Tipler s standard text for calculus based introductory physics courses It includes entirely new artwork updated examples and new pedagogical features There is also an online instructor s resource manual to support the text **Modern Physics** Wolfson, 1999 *Physics for Scientists and Engineers with Modern Physics* Raymond A. Serway, Robert J. Beichner, 2000 This best selling calculus based text is recognized for its carefully crafted logical presentation of the basic concepts and

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