

Comparison between Version 18.2 (2025) and Version 18.3 (2026) of “Fundamentals of Physics” Volume II

The following replacements have been made throughout the document: “have to” replaced with “need to”, “has to” replaced with “needs to” or “must”, “in order to” and “in order for” replaced by “to” and “for”, respectively. Some occurrences of “i.e.” were replaced with “meaning that”.

Chapter	Comments
Part A – Forces	
1. Mass and gravitational force	Somewhat long (22 pages)
2. Charge and electric force	Long (25 pages)
3. Nucleons and nuclear force	(18 pages) The wording of one of the “summary” items was revised to clarify what happens to the nucleus. Clarified how charge is conserved during beta-minus and beta-plus decay. Revised checkpoint 3.8 to use iodine-131 rather than some made-up isotope. Added a footnote mentioning that H-6 decays by spitting out three neutrons. Added a FAQ about electrons in the nucleus (moved from chapter 9).
4. Magnets and magnetic force	Short (12 pages)
Part B – Fields and Energy	
5. Describing Fields	(15 pages) Modified the introduction to provide a clearer transition from the previous part of the book.
6. Quantifying Fields	Short (9 pages) Updated the electric field values around a bulb (using LED; with incandescent and fluorescent provided in a footnote), and replaced the field associated with a stereo receiver with that for a computer monitor. Values were obtained from the EMF-portal (https://www.emf-portal.org/en/emf-source/). Added a footnote with the magnetic field of a microwave (for comparison with the magnetic field of a refrigerator magnet).
7. Conservation of energy	(19 pages) Added a footnote illustrating how the caloric content in food is like the chemical energy in gasoline, and comparing that to the effects of caffeine in so-called energy drinks. Clarified the language describing forces as agents. Fixed Checkpoint 7.3 to remove parts (a) and (c). There was no part (b).
8. Chemical reactions	(15 pages) Removed “affinity” from the sentence describing how the ionization energy depends on the atom, so as to avoid confusing it with electron affinity, which is now discussed in a footnote, along with electronegativity.
9. Nuclear reactions	(16 pages) Moved FAQ about electrons in the nucleus to chapter 3. Added a FAQ comparing the use of the terms fission and fusion with cells and mitochondria.
Part C – Current	
10. The flow of charge	Long (21 pages) Added a bit to footnote ii, describing how conductivity is greater when there are fewer electrons in the outer shell.
11. Electric Current	Long (21 pages) Clarified some wording in the section on single and split paths.

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12. Electromagnets	(17 pages) Added a note about the mass spectrometer. Also added a chapter in the supplemental readings describing the mass spectrometer.
13. Fluids	Long (21 pages) Changed and expanded a great deal. Expanded the introduction. The section on liquids vs. gases was significantly revised. The section on pressure was totally reworked, and a section on the mercury barometer was added, along with a discussion of units and blood pressure. Totally reworked the “moving liquids” section, added some numerical values, removed the incorrect reference to diastolic pressure, separated out the continuity equation to a separate subsection, with “current” section as a separate subsection, and reintroduced examples of localized restrictions (single and split paths) that was removed in a previous edition.
Part D – Circuits	
14. Voltage	Long (23 pages) Added a bullet to the summary (also added in margin within the chapter) that the current depends not only on how hard the battery pushes/pulls but also what is connected to the battery. Clarified a line when discussing the power relationship and added a footnote emphasizing that this is the voltage drop across the line, not the electric potential itself. Added a note that the supplemental readings contain information about using a voltmeter, and additional information was added to the section on voltmeters in the supplemental readings.
15. Resistance	Long (22 pages) Clarified the portion discussing how we use the definition of resistance equation, moving the mathematical reasoning into parenthetical statements.
16. Describing AC circuits	Short (14 pages) One typo (misspelling) fixed.
17. Impedance	Long (22 pages)
18. Induction	(15 pages)
Part E – Waves	
19. Sound	Long (23 pages)
20. Doppler	(12 pages) Moved the note in section 20.1 to a footnote and replaced the note with a note describing how the Doppler effect can be seen with all waves, not just sound waves. Clarified why we are using the terms “source” and “observer” (rather than, say, generator and receiver) to describe the two objects. Clarified introduction to “moving observers” section. Language was clarified to distinguish more clearly between the wavefronts (pulses) and the wave (pulses are spread out more vs. the wave).
21. Interference	Long (21 pages) Clarified one sentence in first section. Edited the “phase” section to clarify the language for in phase and out of phase. The language near the beginning of the “two point sources” section was revised to clarify the distinction between the two speakers being in phase and the two waves being in phase, and the dependence on whether the

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	two speakers are the same distance from the observer. The second on “interference in two dimensions” was revised. Figures 21.3 and 21.4 were merged, shading was added to Figure 21.5 and a figure was added showing a different frequency.
22. Standing Waves	(19 pages) Changed “string with a different weight” to “string that has a different density”. Added vertical arrow at each end of Figure 22.2 to show how the two original waves are generated. Added reference to footnote on page 420. Added figure number and caption to the illustration of the first four normal modes for a string fixed at both ends, free at both ends, and fixed at one end. Previously there was no figure assigned to any of them, and the text referred to Figure 22.5, which didn’t exist.
Part F – Optics	
23. Light as a Wave	(19 pages)
24. Bending of Light	(20 pages) Added red color to illustrate the beam seen on the screen in Figure 24.1. Replaced the dispersion figure (with prism) with one that uses actual values for crown glass from Table 24.3. Added a footnote explaining how magenta security lights can be separated into red and blue images via dispersion.
25. Lenses and Mirrors	Long (21 pages) Some wording edits to clarify in section 25.3 (initially non-parallel rays).
26. Objects and Images	(20 pages) Made several edits to clarify the wording. Made a distinction between units and dimensions, so magnification is dimensionless but could be written with units (like percent) or not. Significantly revised the intro to section 26.2 (explaining magnification) to clarify how the eye interprets the diverging light rays to determine where the object or image is. I added a new figure for this.