

Astrophysics of Gaseous Nebulae and Active Galactic Nuclei, 2nd edition,

Donald E. Osterbrock and Gary J. Ferland

Typos, 2019-02-20

ERRATA FOR THE SECOND AND THIRD PRINTINGS

Chapter 3

Page 52, caption Table 3.4: remove "²S - ³Po" in title for table

Page 52, column headers Table 3.5: "¹P" should be "²P" (4 times).

Chapter 12

Table 12.7, the last column title should be Cygnus Loop.

Line 7 of the full paragraph on the same page should reference Table 12.6

ERRATA FOR THE FIRST PRINTING

Preface

Page xi, second to last line, change surname "Ole" to "Oke"

Chapter 1

Page 4, Figure 1.2 does not give units of vertical axis. Change end of first line of caption to read "... and the altitude (km) above ..." (add "(km)" after word "altitude").

Chapter 2

Page 20, in the second to last equation, the e is the constant 2.718 .. and not the electron charge. The confusion would be avoided if the "and" between the second and third equations were replaced with "(with " e " denoting the base of the natural logarithm, not the electron charge), and"

Page 21, the sentence leading to equation 2.5 should read "Therefore, the recombination coefficient to a specified term $n^2 L$ may be written" (replace "level" with "term")

Page 21, equation 2.6, change term after "exp" to read " $(\mu^2/2kT)$ " (missing factor of two).

Page 24, just above Eq. 2.14, the units on the emission coefficient should be " $\text{erg cm}^{-3} \text{ s}^{-1} \text{ Hz}^{-1} \text{ sr}^{-1}$ ". (change cm^{-2} to cm^{-3}).

Page 25, Table 2.2, top titles for stellar temperatures, change 10^{-4} K to 10^4 K (remove negative sign in two places)

Page 27, Table 2.3, column titles for columns 5 and 6 are the same. The title of column 5 should be “log Q(He⁰) (photons/s)” (same as column 4, but replace “H” with “He”)

Page 36, Figure 2.6, top panel, bottom right of the panel, change H⁺ to H⁰

Page 41, first line after equation 2.37, change 0.19 to 0.0196.

Chapter 3

Page 55, second line of paragraph, ... the cooling EFFICIENCY is reduced...

Page 57, Table 3.13, last line of table, 4th row, change 1.6×10^{-4} to 1.8×10^{-4}

Page 59, caption to Figure 3.1, first line, change $2p^3$ to $2p^2$. Second line change [N III] to [N II].

Page 60, table 3.15, it would be good if we could fit in more entries,

S II $^2D_{3/2}^o$ $5.4 \times 10^4 \text{ cm}^{-3}$

S II $^2D_{5/2}^o$ $1.6 \times 10^4 \text{ cm}^{-3}$

Page 61, middle paragraph line 5, change $n(\text{H}^0)/n(\text{H}^0)$ to $n(\text{H}^0)/n(\text{H})$

Page 62, labels for [N II] $^3P - ^1D$ and [O III] $^3P - ^1D$ are reversed in Figure 3.2.

Chapter 4

Page 72, second to last equation has an a on the left hand side. This should be an α (alpha)

Page 73, Table 4.2, row 4 after “Paschen-line ...” change “P\delta” to “P\epsilon”

Page 75, Table 4.3, “Balmer” – line intensities ($n \rightarrow 2$) relative to $\lambda 4686$ for 5,000K, 10,000K, and 20,000K should be multiplied by 10. Intensities are correct at 40,000K and in Table 4.5.

Page 80, Table 4.5. In the leftmost column, the third line with information should start with a_{4686}^{eff} rather than $a_{\text{H}\beta}^{eff}$.

Page 83, equation 4.24, first equation, right hand side, change “He⁰” to “He⁺”.

Page 85, equation 4.25, right side, change “2hy” to “2h\nu”

Page 89 equation 4.34, left hand, denominator should be corrected to read as $\frac{dI_n}{dt_n}$

Chapter 5

Page 135, equation 5.33, add \epsilon after integral sign (to make it similar to previous integrals signs).

Page 141, equation 5.40, term in numerator of rightmost fraction should include, between the " ν " and the " $d\nu$ " terms, a factor " $\alpha\nu$ ".

Page 150, Figure 5.18, the caption is right in saying 1". The figure should be changed to say 1" next to the vertical bar (it has 1' now).

Add to references: A recent paper on the [O II] collision strengths, which resolves a controversy over their scaling for members of the multiplet, is Kisielius, Storey, Ferland & Keenan, 2009, MNRAS, 397, 903. This paper confirms the statistical weight scaling adopted by Seaton & Osterbrock (1957, ApJ, 125, 66).

Chapter 7

Page 179, line 3, should be a negative sign in front of 2.5.

Page 189, an entire page of the original ms was left out. See file Chap7_missing_ms_page.doc.

Page 196, y-axis labels for Figure 7.9 should be $\langle n_D Q \pi a^2 \rangle n_D / n_H$ [cm⁻²]. (two changes, add an "n_D" and change "cm-1" to "cm-2"). This is the cross section per H nucleon for an ISM dust to gas ratio. The last sentence on page 196 should read "The total cross section per dust grain at a wavelength ..."

Chapter 8

Page 208, caption to Figure 8.1, second line, third word, change "show" to "shown"

Chapter 11

Page 284, line 3, change to read "photon is CHANGED by an"

Page 290, equation 11.9, the terms representing collisional excitation to $n=3$ should give the upper levels as 3^2S , 3^2P^o , and 3^2D (doublet rather than triplet).

Page 291, equation 11.11, the parity is missing from 2^2P^o .

Chapter 12

Table 12.7, the last column title should be Cygnus Loop.

Line 7 of the full paragraph on the same page should reference Table 12.6

Chapter 13

Page 343, second line before equation 13.3, change "Equation (5.23)" to "Equation (5.35)"

Page 351, fifth reference on the page, change spelling of last author from "Kietrich" to "Dietrich"

Chapter 14

Page 368, upper panel of Figure 14.6. The broad bump shortward of $H\beta$ is mislabeled. It should be Fe II 4570.

Appendix 1

Page 396, the flux given in appendix A1.2 is called the physical flux πF in other chapters of the book. F should be written as πF in equations A1.2, A1.3 and A1.4. There should be a π in before the r^2/D^2 in the R.H.S. of eq. A1.4.

Page 396, line two of section A1.2 should read “then only the physical flux πF can be measured”.

Page 396, last line, should be a divide sign between R^2 and d^2 , and missing factor of π , so it reads $\pi r^2/D^2$

Page 396, last line on page should have a division symbol between R^2 and d^2 , and read as $d\Omega \approx R^2 / d^2$

Appendix 2

Page 402 second equation, change $\left(\frac{2\pi kT}{h^2}\right)^{3/2}$ to $\left(\frac{2\pi mkT}{h^2}\right)^{3/2}$

Page 402 second to last equation, integral should include $f(u)$, and appear as

$$\alpha(X^{+i}, T) = \int_0^\infty u f(u) \sigma(u) du.$$

Page 403, last sentence should read: “If s is nonintegral, $E_n(x)$ must be replaced in this formula by $x^{n-1}\Gamma(1-n, x)$.” (replace the chi with x)

Appendix 3

Appendix 4

Page 409, second unnumbered equation is missing commas on right hand side. It should appear more like the equation above it. There should be a comma between “ $3/2$ ” and “ m_j ”, there should be one after the ending “)”, and between the “ $1/2$ ” and “ m_j ”.

Page 411, 15th line from top, change “Figure 2.2” to “Figure 4.4”.

Page 412, Last line in second to last paragraph (8th line from bottom), change both “ $L=0$ ” to “ $J=0$ ”

Acknowledgements

Thanks to the following for reporting typos:

Robert Antonucci

Pat Hal

Christian Knigge

Kirk Korista

Eric Pellegrini

Ryan Porter

Ravi Sankrit

Greg Shields

Mischa Schirmer

Peter van Hoof