Physics of the Interstellar and Intergalactic Medium

Errata in the sixth, seventh, and eighth printings.

Updated 2023.05.23

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Errata in the sixth, seventh, and eighth printings.

- Plate 5 caption, typo:
  ...seen in Plate 6. → ...seen in Plate 4.
  noted 2018.04.07 by L. Bouma.

- §3.8, p. 31, Eq. (3.48), typo: change

$$I_{n\alpha} \propto A_{n\alpha} h\nu_{n\alpha} \int n[\mathrm{H}(n)] ds \propto n^{-6} b_n \int n_e n(\mathrm{H}^+) ds$$

$$\rightarrow I_{n\alpha} \propto A_{n\alpha} h\nu_{n\alpha} \int n[\mathrm{H}(n+1)] ds \propto n^{-6} b_{n+1} \int n_e n(\mathrm{H}^+) ds$$

  noted 2019.02.06

- §7.5, p. 69, Eq. (7.29), typo: missing a factor n_ℓ. Should read

$$\kappa_\nu = n_\ell \sigma_{\ell\rightarrow u} \left(1 - \frac{n_u/g_u}{n_\ell/g_\ell}\right) < 0$$

  noted 2020.10.12 by Yan Liang.

- §9.8, p. 84, typo in line following Eq. (9.35): change
  $(v_{\rm FWHM}/2\,{\rm km\,s^{-1}})^2/3 \quad \rightarrow \quad (v_{\rm FWHM}/2\,{\rm km\,s^{-1}})^{2/3}$.
  noted 2020.09.09 by Roohi Dalal.

- §10.2, sentence preceding Eq. (10.5): change
  ...the Gaunt factor from quantum-mechanical calculations is approximately
  →
  ...the Gaunt factor is approximately (Scheuer 1960)
  noted 2018.11.18 by S. Weinberg.

- §10.5, p. 97, Eq. (10.25), typo (missing factor of 2): should read

$$j_{{\rm fb},\nu} = \frac{g_{\rm b}}{g_e g_i} \frac{2\,h^4\nu^3}{(2\pi m_e kT)^{3/2} c^2}\, {\rm e}^{(I_{\rm b}-h\nu)/kT}\, \sigma_{\rm b,pi}(\nu) n_e n_i$$

  noted 2021.02.14 by Shigenobu Hirose.

- §11.4, p. 110, Eq. (11.34), typo (was off by factor 10^4): should read
$$= 6.53\times10^{-5}\,\mathrm{arcsec}\left(\frac{D/\,\mathrm{kpc}}{L/10^{14}\,\mathrm{cm}}\right)^{1/2}\frac{(\Delta n_e)_{L,\mathrm{rms}}}{10^{-3}\,\mathrm{cm}^{-3}}\nu_9^{-2}$$
noted 2021.10.25 by I. Wasserman.

- §14.7.1, p. 156, Eq. (14.21), typo:
$$\mathrm{H}(^1\mathrm{S}_{1/2}) \;\rightarrow\; \mathrm{H}(^2\mathrm{S}_{1/2})$$
noted 2022.07.06 by S. R. Kulkarni.

- §15.5, p. 174, sentence preceding Eq. (15.36), typo:
$N(\mathrm{He}^+)/N(\mathrm{H}^+) < n_\mathrm{H}/n_\mathrm{He} \;\rightarrow\; N(\mathrm{He}^+)/N(\mathrm{H}^+) < n_\mathrm{He}/n_\mathrm{H}$
noted 2020.09.29 by H. Jia

- §16.5, p. 188, Eq. (16.16), typo: should read
$$\mathrm{H}_2 + \mathrm{CR} \rightarrow \mathrm{H}_2^+ + e^- + \mathrm{CR}$$
noted 2020.09.29 by R. Córdova

- §17.3, p. 195, footnote 3, typos:
...frequency $\sim8\times10^{10}$ Hz... → ...frequency $\sim1.1\times10^{10}$ Hz...
...$\sim10^2$ precession periods. → ...~18 precession periods.
noted 2020.10.02

- §20.1, p. 229, typo just below Eq. (20.2): replace
...unit time that level x will... → ...unit time the level u will...
noted 2020.10.12 by Yan Liang

- §22.6, p. 256, footnote 6: the DDSCAT website has moved. Change
http://code.google.com/p/ddscat → http://www.ddscat.org
noted 2019.03.25

- §23.3.2, p. 268, typo: Si-O-Si bending mode → O-Si-O bending mode
noted 2020.10.12

- §25.3, p. 299, typo following Eq. (25.11): change
...charge $Z_\mathrm{gr} = Ua$ can... → ...charge $Z_\mathrm{gr} = Ua/e$ can...
noted 2021.06.25 by Yu Fung Wong.

- §27.3.1, p 320, typos in coefficient of $\ln(T_4/Z^2)$ term: Eq. (27.19) and (27.20) should read
$$\gamma_A = -1.2130 - 0.0115\ln(T_4/Z^2) \qquad (27.19)$$
$$\gamma_B = -1.3163 - 0.0208\ln(T_4/Z^2) \qquad (27.20)$$
and (27.22) and (27.23) should read
$$\langle E_\mathrm{rr}\rangle_A = \left[0.787 - 0.0115\ln(T_4/Z^2)\right]kT \qquad (27.21)$$
$$\langle E_\mathrm{rr}\rangle_B = \left[0.684 - 0.0208\ln(T_4/Z^2)\right]kT \qquad (27.22)$$
noted 2023.01.29 by S. R. Kulkarni.

- §28.3, p. 328, 4th paragraph, typo: change distance from Θ_1Ori C to the Orion Bar ionization front: $\sim 7.8\times10^{18}\,\mathrm{cm} \;\rightarrow\; \sim 7.8\times10^{17}\,\mathrm{cm}$
  noted 2020.10.26

- §34.4, p. 386, Eq. (34.10): sign mistake on RHS; change

$$-4\pi r^2\kappa\frac{dT}{dr} \quad\rightarrow\quad 4\pi r^2\kappa\frac{dT}{dr}$$

  noted 2019.04.18 by G. Halevi.

- §37.1, p. 413, 2nd paragraph: Change
  Cases of astrophysical interest will normally have..
  →
  Many cases of astrophysical interest will have...
  noted 2018.04.09.

- §37.1, Eq. (37.8): The correction terms for $u_{\rm R}$, $x_{\rm R}$, $u_{\rm D}$, and $x_{\rm D}$ can be improved by analyzing the full cubic equation (37.3): change

$$u_{\rm R}\approx 2c_2 \quad\rightarrow\quad u_{\rm R}\approx 2c_2\left[1-\frac{2c_1^2-3v_{A1}^2}{8c_2^2}\right]$$

$$x_{\rm R}\approx\frac{1}{2}+\frac{2c_1^2+v_{A1}^2}{16c_2^2} \quad\rightarrow\quad x_{\rm R}\approx\frac{1}{2}$$

$$u_{\rm D}\approx\frac{2c_1^2+v_{A1}^2}{4c_2} \quad\rightarrow\quad \frac{2c_1^2+v_{A1}^2}{4c_2}\left[1+\frac{2c_1^2+v_{A1}^2}{8c_2^2}\right]$$

$$x_{\rm D}\approx\frac{4c_2^2}{2c_1^2+v_{A1}^2} \quad\rightarrow\quad x_{\rm D}\approx\frac{4c_2^2}{2c_1^2+v_{A1}^2}\left[1-\frac{v_{A1}^2}{8c_2^2}\right]$$

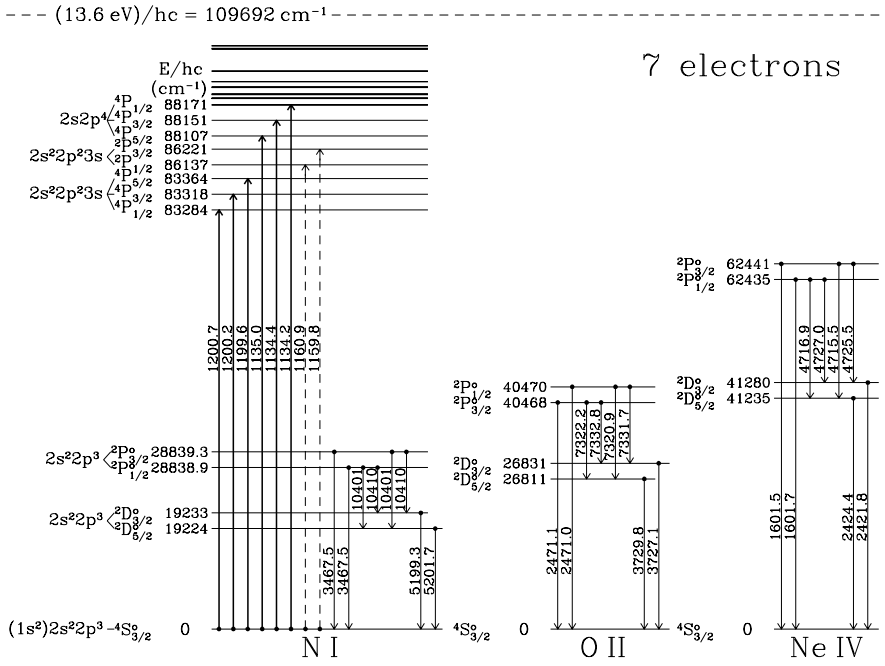
  noted 2018.02.19 by Woong-Tae Kim.

- Appendix B, p. 476: typo: incorrect units for Stefan-Boltzmann constant σ:
  $5.67040\times10^{-5}\,\mathrm{erg\,s^{-1}\,cm^{-3}\,K^{-4}} \;\rightarrow\; 5.67040\times10^{-5}\,\mathrm{erg\,s^{-1}\,cm^{-2}\,K^{-4}}$
  noted 2019.05.14 by Aaron Tran.

- Appendix E, p. 485: diagrams for N IV and O V: the levels shown as $^2\mathrm{P}^o_1$ and $^2\mathrm{P}^o_2$ should be $^3\mathrm{P}^o_1$ and $^3\mathrm{P}^o_2$, respectively.
  noted 2023.05.23

- Appendix E, p. 488: inadvertent omisssion of $^2\mathrm{P}^o_{1/2}\rightarrow{}^2\mathrm{D}^o_{5/2}$ emission lines

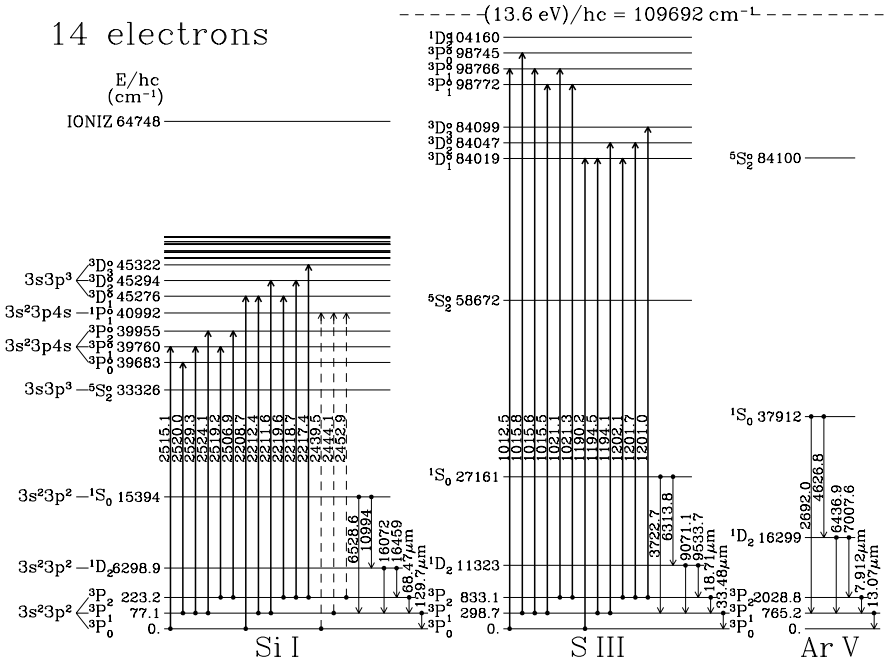
for N I, O II, and Ne IV. Corrected figure:



noted 2023.04.16 by S.R. Kulkarni

- Appendix E, p. 494: inadvertent omission of $^1S_0 \rightarrow {}^1D_2$ emission lines for

Si I and S III. Corrected figure:



noted 2023.04.16 by S.R. Kulkarni

- Appendix F, Table F.5, p. 500: Level u in the fourth line in the table should be $^2\mathrm{P}^o_{3/2}$ rather than $^2\mathrm{P}^o_{5/2}$.
  noted 2022.09.03 by S. R. Kulkarni

- Appendix G, p. 503, typo just before Eq. (G.7): change
  ...solution $x_0 = e^{-i\omega t}$ $\rightarrow$ ...solution $x = x_0 e^{-i\omega t}$.
  noted 2019.02.11

- Appendix I, p. 507, typo (15.78→31.56): Eq. (I.7) should read

$$\frac{Ze^2}{a_0 kT} = \frac{31.56Z}{T_4}$$

  noted 2019.01.14.

- Appendix J, p. 510, Eq. (J.8): missing sign:

$$Y_3 = E_{\rm grav} = \frac{1}{2}\int dV_1 \int dV_2\, G\, \frac{\rho(\mathbf{r}_1)\rho(\mathbf{r}_2)}{|\mathbf{r}_1 - \mathbf{r}_2|}$$

  $\rightarrow$

$$Y_3 = E_{\rm grav} = -\frac{1}{2}\int dV_1 \int dV_2\, G\, \frac{\rho(\mathbf{r}_1)\rho(\mathbf{r}_2)}{|\mathbf{r}_1 - \mathbf{r}_2|}$$

  noted 2020.11.13