

Corrections to *Relativistic Astrophysics of the Transient Universe* by van Putten, M.H.P.M., & Levinson, A., Cambridge University Press (2012)

## Chapter 1.

Caption Fig. 1.6. (c)1997, 2005 Reprinted with permission from the authors [26,638]. Following equation (1.16), the numerical value of  $c^5/G$  is  $3.6 \times 10^{59} \text{ erg s}^{-1}$ .

## Chapter 2.

1. For the power law distribution (2.66) Equation (2.81) should read,

$$\alpha_\nu = \frac{\sqrt{3}e^3}{8\pi m^2 c^2} \left( \frac{3e}{2\pi mc} \right)^{p/2} K(B \sin \alpha)^{(p/2+1)} \Gamma(p/4 + 1/6) \Gamma(p/4 - 11/6) \nu^{-(p+4)/2}. \quad (1)$$

2. In table 2.1 the units of  $j_\nu$  should be:  $\text{erg cm}^{-3} \text{ s}^{-1} \text{ ster}^{-1} \text{ Hz}^{-1}$ , and the units of  $\alpha_\nu$  (Eq. (2.81)):  $\text{cm}^{-1}$

## Chapter 5.

1. Equation (5.42) is correct, but better expressed as

$$\begin{aligned} & \omega^2[(\mathbf{v}_1 \cdot \mathbf{v}_A)\mathbf{v}_A - \mathbf{v}_1] + c_f^2(\mathbf{v}_1 \cdot \mathbf{k})\mathbf{k} \\ & + (\mathbf{v}_A \cdot \mathbf{k})\{(\mathbf{v}_A \cdot \mathbf{k})\mathbf{v}_1 - (\mathbf{v}_1 \cdot \mathbf{v}_A)\mathbf{k} - (\mathbf{v}_1 \cdot \mathbf{k})\mathbf{v}_A\} = 0, \end{aligned} \quad (2)$$

where we define

$$c_f^2 = \frac{\hat{\gamma}p_0 + b_0^2}{w_0 + b_0^2}, \quad \mathbf{v}_A = \frac{\mathbf{b}_0}{\sqrt{w_0 + b_0^2}}. \quad (3)$$

Equation (5.45) then becomes

$$\Lambda_{ij} = (-\omega^2 + k^2 v_A^2 \cos^2 \theta) \delta_{ij} + c_f^2 k_i k_j - k v_A \cos \theta (k_i v_{Aj} + k_j v_{Ai}) + \omega^2 v_{Ai} v_{Aj}, \quad (4)$$

and Equation (5.46)

$$\det(\Lambda_{ij}) = (-\omega^2 + k^2 v_A^2 \cos^2 \theta) [\omega^4 - \omega^2 (c_f^2 + c_s^2 v_A^2 \cos^2 \theta) k^2 + c_s^2 v_A^2 k^4 \cos^2 \theta] = 0, \quad (5)$$

where  $c_s^2 = \hat{\gamma}p_0/w_0$  is the sound speed. Finally, Equation (5.48) should be corrected to

$$(\omega/k)^2 = \frac{c_f^2 + c_s^2 v_A^2 \cos^2 \theta}{2} \pm \frac{1}{2} \sqrt{(c_f^2 + c_s^2 v_A^2 \cos^2 \theta)^2 - 4c_s^2 v_A^2 \cos^2 \theta}. \quad (6)$$

With these corrections the sentence below Eq. (7.6) in Chapter 7 should be changed to: From (5.43) and (7.6) we have  $a = c_f$ .

## Chapter 10.

Equation (10.3) should read  $E = \frac{N}{2} k_B T$ . Equation (10.10) should have  $K$  in the third term on the right hand-side. Equation (10.56) should have  $r^2$  in the denominator.

## References.

Reference [26] Aharonian, F. et al., (HESS Collaboration), 2005, A&A, 437, 95