Errata

of the book

SPECIAL RELATIVITY

IN GENERAL FRAMES

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- p. 88, the right-hand side of Eq. (3.57) has the wrong sign; this equation should read
$$\underline{\boldsymbol{\Omega}}_{\rm FW} = ca(\underline{\boldsymbol{e}}_0 \otimes \underline{\boldsymbol{e}}_1 - \underline{\boldsymbol{e}}_1 \otimes \underline{\boldsymbol{e}}_0)$$
- p. 111, in the title of Sec. 4.5.2, replace *Secondw* by *Second*.
- p. 113, first line below Eq. (4.53): replace *The last two terms* by *The first two terms*.
- p. 113, first line below Eq. (4.55): replace *and the term* $2\vec{\boldsymbol{\omega}} \times_{\boldsymbol{u}} \vec{\boldsymbol{V}}$ by *and minus the term* $2\vec{\boldsymbol{\omega}} \times_{\boldsymbol{u}} \vec{\boldsymbol{V}}$.
- p. 117, first line below Eq. (4.66): replace *On the other side* by *On the other hand*
- p. 124, first line: replace $V_{\rm light} = c_\odot - V_\oplus$ by $V_{\rm light} = c_\odot + V_\oplus$; in the line below, replace $V_{\rm light} = c_\odot + V_\oplus$ by $V_{\rm light} = c_\odot - V_\oplus$.
- p. 148, Sec. 5.5.1, 2nd paragraph, 4th line: replace $t_1^{\rm rec}$, $t_2^{\rm rec}$, $t_1^{\rm em}$ *and* $t_2^{\rm em}$ by $t_1^{\rm em}$, $t_2^{\rm m}$, $t_1^{\rm rec}$ *and* $t_2^{\rm rec}$.
- p. 152, 3 lines below Eq. (5.66): replace $f_1 f_2 = (1 - V^2) f_0^2$ by $f_1 f_2 = (1 - V^2/c^2) f_0^2$.
- p. 190, last paragraph, 2nd line: replace $\vec{\boldsymbol{\ell}}$ *and* $\vec{\boldsymbol{k}}$ *are timelike* by $\vec{\boldsymbol{\ell}}$ *and* $\vec{\boldsymbol{k}}$ *are null*.

- pp. 204 - 210: replace all occurrences of *Chap. 4* in Sec. 6.7 by *Chap. 5*.
- p. 210, 3rd line from the bottom: replace $U' = V_1$ by $U = V_1$.
- p. 210, last line: replace $-V_2 \sin\theta\, \vec{\boldsymbol{e}}_2$ by $V_2 \sin\theta\, \vec{\boldsymbol{e}}_2$.
- p. 214, first line above Eq. (6.117): a factor 2 is missing in the right-hand of the inline equation; it should read $1 + \cosh\psi = 2\cosh^2(\psi/2)$.
- p. 215, Eq. (6.122): the last term in the numerator should be $-\Gamma_2^2$, so that the whole equation should read

$$\sin\theta = \left[\frac{1 + 2\Gamma\Gamma_1\Gamma_2 - \Gamma^2 - \Gamma_1^2 - \Gamma_2^2}{(\Gamma_1^2 - 1)(\Gamma_2^2 - 1)}\right]^{1/2}.$$

- p. 218, footnote 3: change the end of the first sentence to *of open sets such that any open set can be written as the (possibly infinite) union of some members of this family*.
- p. 220, 5 lines below Eq. (7.1): replace $2\pi - \varphi_1$ by $2\pi - \phi_1$.
- p. 235, the middle equation in the system (7.44) has a spurious minus sign in its right-hand side; this equation should read

$$[\boldsymbol{K}_i, \boldsymbol{J}_j] = \sum_{k=1}^{3} \epsilon_{ijk} \boldsymbol{K}_k$$

- p. 236, all the equations in the second and third lines of the system (7.45) have a spurious minus sign in their right-hand sides; these equations should read

$$[\boldsymbol{K}_1, \boldsymbol{J}_2] = \boldsymbol{K}_3, \qquad [\boldsymbol{K}_2, \boldsymbol{J}_3] = \boldsymbol{K}_1, \qquad [\boldsymbol{K}_3, \boldsymbol{J}_1] = \boldsymbol{K}_2$$

$$[\boldsymbol{J}_1, \boldsymbol{K}_2] = \boldsymbol{K}_3, \qquad [\boldsymbol{J}_2, \boldsymbol{K}_3] = \boldsymbol{K}_1, \qquad [\boldsymbol{J}_3, \boldsymbol{K}_1] = \boldsymbol{K}_2$$

- p. 236, in the two lines above Eq. (7.46), the parts $= -\boldsymbol{K}_2$ and $= \boldsymbol{K}_1$ must be changed to respectively $= \boldsymbol{K}_2$ and $= -\boldsymbol{K}_1$, so that these two lines becomes
  Since from (7.45), $[\boldsymbol{K}_1, \boldsymbol{K}_2] = -\boldsymbol{J}_3$, $[\boldsymbol{K}_1, [\boldsymbol{K}_1, \boldsymbol{K}_2]] = -[\boldsymbol{K}_1, \boldsymbol{J}_3] = \boldsymbol{K}_2$ *and* $[\boldsymbol{K}_2, [\boldsymbol{K}_1, \boldsymbol{K}_2]] = -[\boldsymbol{K}_2, \boldsymbol{J}_3] = -\boldsymbol{K}_1$, *(7.41) leads to.*
- p. 236, the signs in front of the $1/12$ terms in Eq. (7.46) are wrong; this equation should read

$$\boldsymbol{\Lambda}_1 \circ \boldsymbol{\Lambda}_2 = \exp\left(\psi_1 \boldsymbol{K}_1 + \psi_2 \boldsymbol{K}_2 - \frac{1}{2}\psi_1\psi_2\boldsymbol{J}_3 + \frac{1}{12}\psi_1^2\psi_2\boldsymbol{K}_2 + \frac{1}{12}\psi_1\psi_2^2\boldsymbol{K}_1 + \cdots\right)$$

- p. 244, first line below Eq. (7.71): replace $-\mathrm{i}$ by $+\mathrm{i}$ in the expression of β.
- p. 245, first line of footnote 11: replace *1927* by *1827*.
- p. 247, unnumbered equation between Eqs. (7.81) and (7.82): replace $(n^2)^3$ by $(n^2)^2$.
- p. 251, footnote 12: replace *same letters than* by *same letters as*.
- p. 266, 2 lines below Eq. (8.25): replace *Annexe A* by *Appendix A*.
- p. 268, 4 lines below Eq. (8.33): replace $\mathrm{Vect}(\vec{\boldsymbol{e}}_0, \vec{\boldsymbol{e}}_i)$ by $\mathrm{Span}(\vec{\boldsymbol{e}}_0, \vec{\boldsymbol{e}}_i)$, as well as in the line below.
- p. 269: the last but one equation in the system (8.38) has a spurious minus sign in its right-hand side; this equation should read

$$[\boldsymbol{K}_i, \boldsymbol{J}_j] = \sum_{k=1}^{3} \epsilon_{ijk} \boldsymbol{K}_k$$

- p. 296, Eq. (9.59): $\vec{\boldsymbol{e}}_x$ must be replaced by $\underline{\boldsymbol{e}}_x$, so that the equation should read

$$\boldsymbol{p}_1 = \frac{E_1}{c}\, \underline{\boldsymbol{u}}_0 + P_1\, \underline{\boldsymbol{e}}_x \qquad \text{and} \qquad \boldsymbol{p}_2 = m_2 c\, \underline{\boldsymbol{u}}_0$$

- p. 300, last line of Remark 9.14: replace *"bounces" onto* by *"bounces" off*.
- p. 307, immediately below Eq. (9.89): insert *Additional constraints, arising from other conservation laws, may forbid reaction (9.88):*.
- p. 315, Eq. (9.115): $\underline{\boldsymbol{a}}_0$ must be replaced by $\vec{\boldsymbol{a}}_0$ and $m\dfrac{\mathrm{d}\Gamma}{\mathrm{d}t}$ by $\dfrac{\mathrm{d}}{\mathrm{d}t}(\Gamma m)$, as well as in the two unnumbered equations above Eq. (9.115).
- p. 338, first line above Eq. (10.61): replace $V_\parallel^2 < c^2 - \vec{\boldsymbol{V}}_\perp \cdot \vec{\boldsymbol{V}}_\perp$ by $V_\parallel^2 (\vec{\boldsymbol{\sigma}} \cdot \vec{\boldsymbol{\sigma}}) < c^2 - \vec{\boldsymbol{V}}_\perp \cdot \vec{\boldsymbol{V}}_\perp$.
- p. 338, third line of the paragraph starting by *Let us suppose*: replace *rayon* by *radius*.
- p. 338, fifth line above Eq. (10.62): insert *line* after *straight*.
- p. 340, second line of Sec. 10.6.2: replace *measured by to an* by *measured by an*.
- p. 345, first line below Eq. (10.78): replace *two vectors de* by *two vectors of*.
- p. 360, Remark 11.7: replace $|h_{\alpha\beta}| \ll |g_{\alpha\beta}|$ by $|(q/m) h_{\alpha\beta}| \ll |g_{\alpha\beta}|$.

- p. 375, second line below Eq. (11.99): replace $\mathbb{R}^4$ by $\mathbb{R}^{16}$.
- p. 376, end of Sec. 11.5.1.1: replace the last sentence by *Note that both sheets of the null cone, past and future, contribute to the action.*
- p. 376, fourth line below Eq. (11.101): replace *propagates thus* by *thus propagates*.
- p. 385, second line below Eq. (12.13): replace *in the proper time* by *is the proper time*.
- p. 405, second unnumbered equation at the top of the page: replace y'_* by y_* and z'_* by z_*.
- p. 414, Eq. (12.85): remove the factor $1/2$ in front of V^2/c^2.
- p. 415, first line below Eq. (12.89): replace $mc^2 + b$ by $m(c^2 + \gamma b)$.
- p. 420, Table 12.1: in the first row, replace $\mathbf{\Lambda}_0$ by $\mathbf{\Lambda}$ and, in the last row, replace $\vec{\varepsilon}_1$ by $\vec{\varepsilon}$.
- p. 435, first line below Eq. (13.23): replace *has not exactly* by *does not have exactly*.
- p. 445, last line of footnote 4: replace *not less* by *no less*.
- p. 446, 6th line above Eq. (13.49): replace *Even, we shall use* by *We shall even use*.
- p. 446, last but one line: replace $\vec{\boldsymbol{u}} \cdot \mathrm{d}\vec{\boldsymbol{V}} = 0$ by $\vec{\boldsymbol{u}} \cdot \vec{\boldsymbol{V}} = 0$.
- p. 465, third line below Eq. (13.103b): replace *the same than that at the emission* by *the same as the one during the emission*
- p. 467, unnumbered equation above Eq. (13.108): the expression of v_- should be $c + r\omega$, so that the whole equation becomes

$$v_+ = c - r\omega \quad \text{and} \quad v_- = c + r\omega \quad \text{(aether)}$$

- p. 467, last but one line: replace *This is thus Georges Sagnac* by *It is thus Georges Sagnac*.
- p. 493, fourth line above Eq. (14.80): replace *We recognize in the first term* by *We recognize in the first two terms* and, two lines below, replace *second term* by *third term*.
- p. 495, third line above Eq. (15.1): replace *pure mathematical* by *purely mathematical*.

- p. 498, third line of Remark 15.1: replace *We had not to use* by *We did not have to use*.
- p. 521, Eq. (16.1): replace the wedge product by a cross product, so that the equation becomes:

$$\mathrm{d}V = \mathrm{d}\vec{\ell}_1 \cdot (\mathrm{d}\vec{\ell}_2 \times \mathrm{d}\vec{\ell}_3).$$

- p. 724, first line of legend of Fig. 22.3: replace *on a polar orbit* by *in a polar orbit*.
- p. 724, second line of Sec 22.3.2: replace *leads to abandon* by *leads to the abandoning of*
- p. 725, 6th line below Eq. (22.30): replace *leads to abandon* by *leads to the abandoning of*