

# Erratum: The hadronic properties of the photon in high-energy interactions [Rev. Mod. Phys. 50, 261 (1978)]

T. H. Bauer\*, R. D. Spital,† and D. R. Yennie

Laboratory of Nuclear Studies, Cornell University, Ithaca, New York 14853

F. M. Pipkin

Department of Physics, Harvard University, Cambridge, Massachusetts 02138

Please note the following corrections:

Page 261: At the bottom of the left-hand column the acknowledgment should read: "The preparation of this review was supported in part by the National Science Foundation (Cornell) and in part by the Department of Energy (Harvard)."

Page 264: Line 18 of the left-hand column should read "Nachtmann (1977)."

Page 268: Line 44 of the left-hand column should read "... total photon-nucleon cross section....."

Page 272: Line 45 of the right hand column should read "...  $1/(3\mathcal{M}^2 + Q^2)$ ."

Page 274: Line 8 of Table I should read:

$$\frac{f_V^2}{4\pi} = \frac{\bar{f}_V^2}{4\pi} \left(1 - \frac{\bar{\Pi}_V(0)}{m_V^2}\right).$$

Line 14 of Table I should read:

$$\frac{\hat{f}_V^2}{4\pi} = \alpha \frac{|T_{V\gamma}|^2}{|T_{\gamma V}|^2}.$$

Line 18 of Table I should read:

$$\frac{\bar{f}_{\rho\pi\pi}^2}{4\pi} = 12 \frac{\Gamma_{\rho \rightarrow \pi\pi}}{m_\rho} \left(1 - \frac{4m_\pi^2}{m_\rho^2}\right)^{-3/2}.$$

Page 280: Line 4 of the right-hand column should read "... for  $x \leq 0.15$  are shown...."

Line 9 of footnote 27 should read " $R_\rho(Q^2 + 3\mathcal{M}^2)/2\nu \approx 3.5x[1 + (3\mathcal{M}^2/Q^2)] \dots$ "

Page 291: Line 22 of the right-hand column should read "... Caldwell *et al.*, 1977...."

Line 3 of the caption for Fig. 27 should read "... Caldwell *et al.*, 1977...."

Page 292: Last line of the caption for Fig. 28 should read "... Caldwell *et al.*, 1977...."

Page 294: In Table II the units for the quantities labeled  $b$ ,  $c_b$ , and  $c_{A_2}$  should be  $\mu\text{b-GeV}^{1/2}$ .

Page 298: In Table IV the entry with Fujii as the first author should be deleted.

Page 301: Lines 3 and 4 of the right-hand column

should read "...  $B = (9.0 \pm 0.2) \text{ GeV}^{-2}$  and  $C = (2.5 \pm 0.3) \text{ GeV}^{-4}$ ."

Page 307: Line 13 of the right-hand column should read "... was  $(87 \pm 3)\%$ , the measuring efficiency  $(88 \pm 2)\%$ , ..."

Page 311: In Table IX

- (a) The particles detected by the CEA collaboration should be " $p, \pi^+, \pi^-$ ".
- (b) The particles detected by SLAC (Bulos *et al.*) should be " $\pi^+ \pi^-$ ".
- (c) The beam used by SLAC (Anderson *et al.*) should be "bremsstrahlung".
- (d) The technique used by SLAC-ST (Davier *et al.*) should be "Streamer-chamber".

Page 314: In Table X the  $d\sigma/dt|_{t=0}$  using the Spital-Yennie method for the SBT group should be

$E_\gamma$ (GeV)	$d\sigma/dt _{t=0}$ ( $\mu\text{b-GeV}^{-2}$ )
2.8	158 ± 13
4.7	109 ± 8
9.3	94 ± 4

Page 315: In Table XI

- (a) The heading for the right most column should be " $\sigma^T(\gamma p \rightarrow p\rho^0)$ ".
- (b) The  $\sigma^T(\gamma p \rightarrow p\rho^0)$  for the SBT group should be the following

$E_\gamma$ (GeV)	Fit method	$\sigma^T(\gamma p \rightarrow p\rho^0)$ ( $\mu\text{b}$ )
2.8	$\Pi(t)$	18.6 ± 1.1
	$(M_\rho/M_{\rho^+})^{n(t)}$	21.0 ± 1.0
	Söding	18.6 ± 1.0
	Spital-Yennie	25.1 ± 2.6
4.7	$\Pi(t)$	14.5 ± 1.0
	$(M_\rho/M_{\rho^+})^{n(t)}$	16.2 ± 0.7
	Söding	15.9 ± 0.7
	Spital-Yennie	18.2 ± 1.6
9.3	$\Pi(t)$	11.8 ± 0.5
	$(M_\rho/M_{\rho^+})^{n(t)}$	13.3 ± 0.5
	Söding	13.5 ± 0.5
	Spital-Yennie	14.9 ± 1.0

Page 316: Line 8 of the left-hand column should read "Fig: 72 shows...."

Page 318: Line 2 of the caption for Fig. 77 should

\*Present address: Reactor Analysis and Safety Division, Argonne National Laboratory, Argonne, Illinois 60439.

†Present address: Pfizer Medical Systems, Columbia, Maryland 21045.

read "... with  $\Gamma_\rho = 155 \text{ MeV} \dots$ "

Page 320: Line 5 of the right-hand column should read "... form,  $A \exp(Bt)$ , yields..."

Page 322:

(a) Equation (3.44c) should read

$$"f_\rho^2/4\pi = 2.52 \pm 0.16."$$

(b) Equation (3.45b) should read

$$"d\sigma/dt|_{\theta=0}(\gamma p \rightarrow \rho p) = (76 \pm 8) \mu\text{b}/\text{GeV}^2."$$

(c) Equation (3.47a) should read

$$"\xi = 0.0097 \pm 0.0008."$$

Page 330: The expression for  $B_\rho$  should read

$$"B_\rho = (7.1 \pm 0.5) \text{ GeV}^{-2}"$$

Page 332: The last line of the right-hand column should read

$$"... that  $B = 7.5 \text{ GeV}^{-2} \dots$ "$$

Page 333: Line 10 of the right-hand column should read

$$"Rochester 8.9 \text{ GeV } 7.4 \pm 0.5 \mu\text{b}/\text{GeV}^2."$$

Page 334: Equation (3.78c) should read

$$"f_\omega^2/4\pi = 38.0 \pm 8.4."$$

Page 336: In Table XIX, the entry for the measured quantities under Harvard-CEA (Gladding *et al.*, 1973) should read

$$" \left. \frac{d\sigma}{dt} \right|_\rho \bigg/ \left. \frac{d\sigma}{dt} \right|_\omega = 7.7 \pm 1.2."$$

Page 338: Line 38 of the right-hand column should read

"... for the  $\phi$ . It is customary to assume that the decay..."

Page 341: Line 2 of the right-hand column should read

"... Becker *et al.*, 1968; Alvensleben..."

Page 342: Line 25 of the left-hand column should read

"... was taken to be the colliding-beam value 13.2."

Page 345: On this page the symbol of  $\Gamma$  should not be bold face.

Page 348: In Table XXVI:

(a) The next to the last line of the caption should read

"... formalism of Costa de Beauregard *et al.* (1977)."

(b) The last entry of the column labeled Parameter should be

$$" \chi^2/DF "$$

$$A_{\text{eff}} = \frac{4\sqrt{\pi}}{\sigma_\gamma} \text{Im} \left\{ AT_{\gamma\gamma} - \sum_V 2\sqrt{\pi} iT_{\gamma V}^2 \int d^2b dz_1 dz_2 \bar{n}(\mathbf{b}, z_1) \bar{n}(\mathbf{b}, z_2) \times \theta(z_2 - z_1) e^{i q_{\parallel}^{(V)}(z_1 - z_2)} \exp \left( -\frac{1}{2} \sigma_V (1 - i\alpha_V) \int_{z_1}^{z_2} \bar{n}(\mathbf{b}, z') dz' \right) \right\}$$

(c) Under Case II the entry for  $[B(\omega \rightarrow \pi^+ \pi^-)]^{1/2}$  should be

$$"(0.171 \pm 0.041"$$

(d) Add to the Table caption the statement

"The parameter  $d$  is defined by  $(1 - \bar{\Pi}_\rho(0)/m_\rho^2) = (1 + d\Gamma_\rho/m_\rho)$ ."

Page 353:

(a) The last line of the caption for Fig. 135 should read

"... (from Feldman and Perl, 1977)."

(b) The last two lines of the caption for Fig. 136 should read

"... (from Schwitters, 1975)."

Page 357: Line 15 of the left-hand column should read

"... for the ratio  $\pi^+ p \rightarrow \Delta^{++} \rho^0 / \Delta^{++} \rho^+$ ..."

Page 359: Line 1 of the caption for Fig. 150 should read

"Threshold behavior at  $t = t_{\text{min}}$  for..."

Page 362: Line 13 of the left-hand column should read

"...  $\epsilon$  is the polarization parameter,  $\nu = E - E'$  is ..."

Page 367: Equation (3.140) should read

$$r = \left[ E \frac{d^2\sigma}{dx dy} \right] (E = 150) / \left[ E \frac{d^2\sigma}{dx dy} \right] (E = 56)$$

Page 368: Line 18 of the left-hand column should read

" $B\bar{N}GM$  is satisfied..."

Page 375: Line 27 of the left-hand column should read

"obtained 53, 109, and 78..."

Page 377: Line 1 of the caption for Fig. 186 should read

"... for different  $W$  and ..."

Page 379: The caption for Fig. 191 should read

"... for different values of  $W$ ."

Page 385: Line 2 of the left-hand column should read

" $\rho^0$  in its purest state,..."

Page 387: Line 4 of the right-hand column should read

"...  $|T_{\gamma\rho}|^2 = e^2/f_\rho^2 \dots$ "

Page 388: Line 22 of the right column should read

"...  $\sigma_\omega = 27 \text{ mb}$ , they find  $d\sigma_{\gamma\omega}/dt = \dots$ "

Page 392:

(a) Equation (5.4) should read

(b) Eq. (5.6) auxiliary information should read

$$\sigma_{VA} = 2 \operatorname{Re} \int d^3b \left[ 1 - \exp \left( -\frac{\sigma_V}{2} (1 - \alpha_V) \right. \right. \\ \left. \left. \times \int_{-\infty}^{+\infty} \tilde{n}(\mathbf{b}, z') dz' \right) \right]$$

(c) Line 2 of the footnote 47 should read

"... by  $(e/\bar{f}_V)[m_V^2/(m_V^2 + Q^2)]$ "

Page 393: The initial entry in Table XXXV should read

$$\left( \frac{f_V^2}{4\pi} \right)_{\text{eff}} = \left( \frac{\bar{f}_V^2}{4\pi} \cdot \frac{\hat{f}_V^2}{4\pi} \right)^{1/2}$$

Page 394: Line 5 of the left column should read

"... is shown in Fig. 32, and ..."

Page 397:

(a) The second line after Eq. (5.10) should read

$$T_{\gamma m}(t) = \sum_V (e/\bar{f}_V) T_{Vm}(t) \dots$$

(b) In Eq. (5.11), the first part of the second line

should read

$$\times \left| \sum \frac{e}{\bar{f}_V} T_{Vm}(t) \dots \right.$$

Page 401: Line 8 of the left-hand column should read

"... of the higher-mass contributions, these ..."

Page 405: Add to the end of the caption for Fig. 206

"(from Devenish and Schildknecht, 1976)"

Page 408: On line 39 of the right-hand column after sentence ending in resonances add the sentence

"It is important to have high statistics measurements similar to those carried out by the Orsay group for the  $\rho^0 - \omega$  peak."

Page 412: The first part of Eq. (B7) should read

$$\langle 0 | \Gamma_A(b) | 0 \rangle = 1 - \left[ 1 - \int \Gamma(\mathbf{b} - \mathbf{s}) \rho_1(\mathbf{s}, z) d^2s dz \right]^A$$

Page 418: Line 45 of the right-hand column should read

"(149.6  $\pm$  23.2) and (775.4  $\pm$  7.3) MeV ..."