



## Correction to: Gauge Invariance for Classical Massless Particles with Spin

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### Correction to: Foundations of Physics (2021) 51:7 <https://doi.org/10.1007/s10701-021-00415-2>

The author would like to correct errors in the formatting of certain upper-lower index pairs in the publication of the original article that arose during the proofing process. The corrected details are given below.

(a) Page 5: “Thus, the components  $a^\mu$  of the four-vector  $a$  and the entries  $\Lambda_\nu^\mu$  of the Lorentz-transformation matrix” should be changed to “Thus, the components  $a^\mu$  of the four-vector  $a$  and the entries  $\Lambda_\nu^\mu$  of the Lorentz-transformation matrix”.

(b) Page 5: “remembering that these variables are independent of the Lorentz-transformation variables  $\Lambda_\nu^\mu$ ” should be changed to “remembering that these variables are independent of the Lorentz-transformation variables  $\Lambda_\nu^\mu$ ”.

(c) Page 6:

$$[\sigma_{\mu\nu}]_\beta^\alpha = -i\delta_\mu^\alpha \eta_{\nu\beta} + i\eta_{\mu\beta} \delta_\nu^\alpha.$$

should be changed to

$$[\sigma_{\mu\nu}]_\beta^\alpha = -i\delta_\mu^\alpha \eta_{\nu\beta} + i\eta_{\mu\beta} \delta_\nu^\alpha.$$

(d) Page 7:

$$\frac{1}{2}[\sigma^{\mu\nu}]_\beta^\alpha A_\alpha^\beta = iA^{\mu\nu},$$

should be changed to

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The original article can be found online at <https://doi.org/10.1007/s10701-021-00415-2>.

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$$\frac{1}{2} \underline{[\sigma^{\mu\nu}]^\alpha_\beta A^\beta}_\alpha = iA^{\mu\nu},$$

(e) Page 7:

$$\frac{1}{2} \text{Tr}[S\dot{\Lambda}\Lambda^{-1}] \equiv \frac{1}{2} S^\alpha_\beta \dot{\Lambda}^\beta_\gamma (\Lambda^{-1})^\gamma_\alpha.$$

should be changed to

$$\frac{1}{2} \text{Tr}[S\dot{\Lambda}\Lambda^{-1}] \equiv \frac{1}{2} \underline{S^\alpha_\beta \dot{\Lambda}^\beta_\gamma (\Lambda^{-1})^\gamma_\alpha}.$$

(f) Page 11:

$$\bar{p}^\mu = \bar{\Lambda}^\mu_\nu p_0^\nu,$$

should be changed to

$$\bar{p}^\mu = \underline{\bar{\Lambda}^\mu_\nu} p_0^\nu,$$

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