Eur. Phys. J. C (2025)85:867
https://doi.org/10.1140/epjc/s10052-025-14570-7

THE EUROPEAN PHYSICAL JOURNAL C

Erratum

Erratum to: RG-stable parameter relations of a scalar field theory in absence of a symmetry

Howard E. Haber[1,a], **P. M. Ferreira**[2,3,b]

[1] Santa Cruz Institute for Particle Physics, University of California, 1156 High Street, Santa Cruz, CA 95064, USA
[2] Instituto Superior de Engenharia de Lisboa, Lisbon, Portugal
[3] Centro de Física Teórica e Computacional, Universidade de Lisboa, Lisbon, Portugal

Received: 30 June 2025 / Accepted: 21 July 2025

Erratum to: Eur. Phys. J. C (2025) 85:541
https://doi.org/10.1140/epjc/s10052-025-14148-3

1. In Eq. (3.13), there was an error in the second of the three equalities. The corrected version of Eq. (3.13) is

$$M^2_{1\bar{1}} = M^2_{2\bar{2}}, \quad \text{Re}\, M^2_{1\bar{2}} = 0, \quad M^2_{11} = -M^2_{22}, \tag{3.13}$$

2. In light of the corrected version of Eq. (3.13), the sentence following Eq. (3.16) should then read:

This leaves us with six independent squared-mass parameters and 19 independent quartic coupling parameters.

and the first line of Eq. (3.17) should read:

$$V_C = M^2\left(|\Phi_1|^2 + |\Phi_2|^2\right) + i\,\text{Im}\, M^2_{1\bar{2}}\left(\Phi_1^*\Phi_2 - \Phi_1\Phi_2^*\right)$$
$$+\left[\bar{M}^2\left(\Phi_1^2 - \Phi_2^2\right) + M^2_{12}\,\Phi_1\Phi_2 + \text{c.c.}\right]$$

3. Immediately following Eq. (3.17), the following phrase should be added:

where $M^2 \equiv M^2_{1\bar{1}} = M^2_{2\bar{2}}$ and $\bar{M}^2 \equiv M^2_{11} = -M^2_{22}$.

4. Immediately following Eq. (3.18) the text should be modified to read:

so that all scalar potential coefficients are real. It then follows that $M^2_{1\bar{2}} = 0$, which finally leaves us with three independent real squared-mass parameters (M^2, $\bar{M}^2$, and M^2_{12}) and 11 independent real quartic coupling parameters (Λ_i for $i = 1, 2, \ldots, 11$) that govern the complexification of the toy model of Sect. 2.

5. We thank Patrick Fox for pointing out the error in the original published version of Eq. (3.13) and for other insightful remarks in discussions with H.E.H. at the Munich Institute for Astro-, Particle and BioPhysics (MIAPbP), which is funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany's Excellence Strategy EXC-2094 – 390783311, and at the Aspen Center for Physics, which is supported by the National Science Foundation Grant No. PHY- 2210452.

Funded by SCOAP[3].

The original article can be found online at https://doi.org/10.1140/epjc/s10052-025-14148-3.

[a] e-mail: haber@scipp.ucsc.edu (corresponding author)
[b] e-mail: pmmferreira@ciencias.ulisboa.pt

Published online: 12 August 2025