



Corrigendum

Corrigendum to “The effective chiral Lagrangian for a light dynamical “Higgs Particle”” [Phys. Lett. B 722 (2013) 330–335]

R. Alonso^a, M.B. Gavela^{a,b}, L. Merlo^{a,b}, S. Rigolin^c, J. Yepes^a^a Departamento de Física Teórica and Instituto de Física Teórica, IFT-UAM/CSIC, Universidad Autónoma de Madrid, Cantoblanco, 28049 Madrid, Spain^b CERN, Department of Physics, Theory Division, CH-1211 Geneva 23, Switzerland^c Dipartimento di Fisica “G. Galilei”, Università di Padova and INFN, Sezione di Padova, Via Marzolo 8, I-35131 Padua, Italy

ARTICLE INFO

Article history:

Available online 21 September 2013

When fermion masses are not neglected, two operators should be added to the basis published in Ref. [1], so that the complete set amounts to 26 effective operators in $\mathcal{L}_{\chi=4}^h$. This can be seen using the equation of motion for the light h :

$$-\partial_\mu \partial^\mu h = \frac{v^2}{4} \text{Tr}[V_\mu V^\mu] \frac{\partial \mathcal{F}_C(h)}{\partial h} + \frac{\partial V(h)}{\partial h} + \frac{v}{\sqrt{2}} (\bar{Q}_L \mathbf{U} \mathbf{Y} Q_R \mathcal{F}_Y(h) + \text{h.c.}).$$

It follows that the following two operators

$$\mathcal{P}_{18'}(h) = \text{Tr}(\mathbf{V}_\mu \mathbf{V}^\mu) \partial_\nu \mathcal{F}_{19}(h) \partial^\nu \tilde{\mathcal{F}}_{19}(h),$$

$$\mathcal{P}_{20'}(h) = (\text{Tr}(\mathbf{T} \mathbf{V}_\mu))^2 \partial_\nu \mathcal{F}_{21}(h) \partial^\nu \tilde{\mathcal{F}}_{21}(h),$$

can be reduced to a combination of $\mathcal{P}_6(h) + \mathcal{P}_{18}(h)$ and $\mathcal{P}_{21}(h) + \mathcal{P}_{23}(h)$, respectively, plus a term that can be absorbed in the re-definition of the couplings of the gauge bosons and h , plus a term containing a dependence on the Yukawa couplings. When fermion masses are considered, these operators are redundant; otherwise they are independent and must be taken into consideration.

We profit from this erratum to point out another fact, although it has no impact on the basis. The equations of motion for the gauge fields and the Dirac equation in the section *Massive fermions*: $D_\mu \mathbf{V}^\mu \neq 0$ must be substituted by

$$(D^\mu W_{\mu\nu})_j = i \frac{g}{4} v^2 \text{Tr}[\mathbf{V}_\nu \sigma_j] \mathcal{F}_C(h) + \frac{g}{2} \bar{Q}_L \gamma_\nu \sigma_j Q_L,$$

$$\partial^\mu B_{\mu\nu} = -i \frac{g'}{4} v^2 \text{Tr}[\mathbf{T} \mathbf{V}_\nu] \mathcal{F}_C(h) + g' \sum_{i=L,R} \bar{Q}_i \gamma_\nu \mathbf{h}_i Q_i,$$

and

$$i \mathcal{D}_L Q_L = \frac{v}{\sqrt{2}} \mathbf{U} \mathbf{Y} Q_R \mathcal{F}_Y(h),$$

$$i \mathcal{D}_R Q_R = \frac{v}{\sqrt{2}} \mathbf{Y}^\dagger \mathbf{U}^\dagger Q_L \mathcal{F}_Y(h).$$

As a result, the two structures containing the contraction $\mathcal{D}_\mu \mathbf{V}^\mu$ become

$$\frac{iv}{\sqrt{2}} \text{Tr}(\sigma_j \mathcal{D}_\mu \mathbf{V}^\mu) \mathcal{F}_C(h) = -\frac{iv}{\sqrt{2}} \text{Tr}(\sigma_j \mathbf{V}^\mu) \partial_\mu \mathcal{F}_C(h) + i \bar{Q}_L \sigma_j \mathbf{U} \mathbf{Y} Q_R \mathcal{F}_Y(h) + \text{h.c.},$$

$$\frac{iv}{\sqrt{2}} \text{Tr}(\mathbf{T} \mathcal{D}_\mu \mathbf{V}^\mu) \mathcal{F}_C(h) = -\frac{iv}{\sqrt{2}} \text{Tr}(\mathbf{T} \mathbf{V}^\mu) \partial_\mu \mathcal{F}_C(h) + i \bar{Q}_L \mathbf{T} \mathbf{U} \mathbf{Y} Q_R \mathcal{F}_Y(h) + \text{h.c.}$$

This change has not impact neither on the total number of operators of the basis nor on its composition. In particular, as stated in the article, operators $\mathcal{P}_{11-13}(h)$ are physical only when fermion masses are considered, otherwise they can be written in terms of the other operators of the basis. The same applies to operators $\mathcal{P}_{16}(h)$ and $\mathcal{P}_{17}(h)$.

An updated version of this article, with all the operators consecutively renumbered can be found in Ref. [1].

References

- [1] R. Alonso, M. Gavela, L. Merlo, S. Rigolin, J. Yepes, arXiv:1212.3305.

DOI of original article: <http://dx.doi.org/10.1016/j.physletb.2013.04.037>.

E-mail addresses: rodrigo.alonso@uam.es (R. Alonso), belen.gavela@uam.es (M.B. Gavela), luca.merlo@uam.es (L. Merlo), stefano.rigolin@pd.infn.it (S. Rigolin), ju.yepes@uam.es (J. Yepes).