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Erratum: Effective field theory after a new-physics discovery

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The two linear relations between operators shown in eq. (3.29) were missing an integral over the momentum fraction u on the right-hand side. The correct relations are

$$\begin{aligned}
& S \bar{\mathcal{X}}_{L,n_1}^i i\vec{\phi}_\perp \mathcal{X}_{L,n_2}^j + (n_1 \leftrightarrow n_2) \\
&= \int_0^1 du \left[(\mathbf{Y}_f)^{jk} \left(O_{F_L \bar{f}_R}^{ik} + O_{F_L \bar{f}_R \phi}^{(2)ik} \right) - \sum_r (O_{F_L \bar{F}_L A_r}^{ji})^\dagger \right], \\
& S [\bar{\mathcal{X}}_{L,n_1}^i (-i\overleftarrow{\vec{\phi}}_\perp) \mathcal{X}_{L,n_2}^j] + (n_1 \leftrightarrow n_2) \\
&= \int_0^1 du \left[(\mathbf{Y}_f^*)^{ik} \left[(O_{F_L \bar{f}_R}^{jk})^\dagger + (O_{F_L \bar{f}_R \phi}^{(2)jk})^\dagger \right] - \sum_r O_{F_L \bar{F}_L A_r}^{ij} \right].
\end{aligned} \tag{3.29}$$

In the one-particle anomalous dimensions in eq. (5.7) two fractions were mistyped. The correct expressions read

$$\begin{aligned}
\gamma^{fL} = \gamma^{\bar{f}L} &= -Y_{fL}^2 \frac{\alpha_1}{4\pi} - \frac{9\alpha_2}{16\pi} - \delta_{fq} \frac{\alpha_3}{\pi} + \frac{1}{32\pi^2} \mathbf{Y}_f \mathbf{Y}_f^\dagger, \\
\gamma^{fR} = \gamma^{\bar{f}R} &= -Y_{fR}^2 \frac{\alpha_1}{4\pi} - \delta_{fq} \frac{\alpha_3}{\pi} + \frac{1}{16\pi^2} \mathbf{Y}_f^\dagger \mathbf{Y}_f, \\
\gamma^\phi &= -\frac{\alpha_1}{4\pi} - \frac{3\alpha_2}{4\pi} + \sum_f \frac{N_c^f y_f^2}{16\pi^2}.
\end{aligned} \tag{5.7}$$

In the calculation of the anomalous dimension $\Gamma_{\text{mix}}(u, w, \mu)$ in eq. (5.16) we missed the contribution of a one-particle reducible diagram. When this is included, we find

$$\Gamma_{\text{mix}}(u, w, \mu) = \frac{C_F \alpha_s(\mu)}{\pi} \left[\frac{\theta(1-u-w)}{1-u} - (1-w) \right] + \mathcal{O}(\alpha_s^2). \tag{5.16}$$

We are grateful to Martin Beneke and Robert Szafron for pointing out this omission.

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