Erratum: Effects of mixing with quark singlets [Phys. Rev. D 67, 035003 (2003)]

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A bug entered the code for the evaluation of the *CP* asymmetry $a_{D_s^+ D_s^-}$. The correct results for the allowed range of variation of this quantity in model I are shown in Fig. 1. In model II this asymmetry has values between -3×10^{-3} and 0.11 (the latter is a factor of 2–3 larger than the SM prediction).

Accordingly, in model I the allowed range of $a_{D_s^+ D_s^-}$ written through the text is actually between -0.4 and 0.4. The best fit matrix in Eqs. (83) gives $a_{D_s^+ D_s^-}$ similar to the SM value.

The maximum number of events $K_L \to \pi^0 \nu \bar{\nu}$ predicted for the KOPIO experiment is incorrectly written as 40. With the rates obtained for this decay, the expected number of events can be up to 10^3.

Independently of these changes, there are a few typos in the published version of the paper, which do not affect the results. In the equations written for neutral meson mixing there are some missing factors of two in the terms involving two different internal quarks. These factors were however included in the numerical code. The correct equations read (the expressions for Δ_K^{II}, Δ_B^{II}, and $\Delta_{B_s}^{\mathrm{II}}$ are unchanged)

$$M_{12}^K = \frac{G_F^2 M_W^2 f_K^2 \hat{B}_K m_{K^0}}{12\pi^2}[(\lambda_{ds}^c)^2 \eta_{cc}^K S_0(x_c) + (\lambda_{ds}^t)^2 \eta_{tt}^K S_0(x_t) + 2\lambda_{ds}^c \lambda_{ds}^t \eta_{ct}^K S_0(x_c, x_t) + \Delta_K], \quad (35)$$

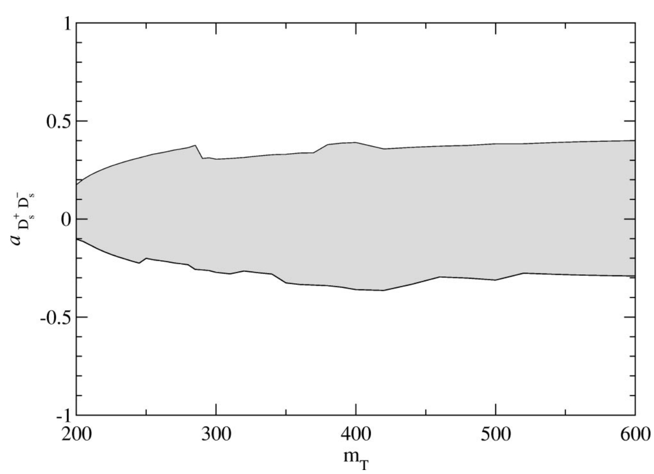

FIG. 1. Range of variation of $a_{D_s^+ D_s^-}$ in model I (shaded area).

$$\Delta_K^{\mathrm{I}} = (\lambda_{ds}^T)^2 \eta_{TT}^K S_0(x_T) + 2\lambda_{ds}^c \lambda_{ds}^T \eta_{cT}^K S_0(x_c, x_T) + 2\lambda_{ds}^t \lambda_{ds}^T \eta_{tT}^K S_0(x_t, x_T),$$

$$\Delta_K^{\mathrm{II}} = -8 X_{ds}[\lambda_{ds}^c \eta_Z^K Y_0(x_c) + \lambda_{ds}^t \eta_{tt}^K Y_0(x_t)] + \frac{4\pi s_W^2}{\alpha} \eta_Z^K X_{ds}^2, \quad (36)$$

$$\Delta_B^{\mathrm{I}} = (\lambda_{db}^T)^2 \eta_{TT}^B S_0(x_T) + 2\lambda_{db}^t \lambda_{db}^T \eta_{tT}^B S_0(x_t, x_T),$$

$$\Delta_B^{\mathrm{II}} = -8 X_{db} \lambda_{db}^t \eta_{tt}^B Y_0(x_t) + \frac{4\pi s_W^2}{\alpha} \eta_Z^B X_{db}^2, \quad (40)$$

$$\Delta_{B_s}^{\mathrm{I}} = (\lambda_{sb}^T)^2 \eta_{TT}^{B_s} S_0(x_T) + 2\lambda_{sb}^t \lambda_{sb}^T \eta_{tT}^{B_s} S_0(x_t, x_T),$$

$$\Delta_{B_s}^{\mathrm{II}} = -8 X_{sb} \lambda_{sb}^t \eta_{tt}^{B_s} Y_0(x_t) + \frac{4\pi s_W^2}{\alpha} \eta_Z^{B_s} X_{sb}^2. \quad (47)$$

In the effective Lagrangian parametrizing the interactions in atomic parity violation there is an spurious γ^5. The correct equation reads

$$\mathcal{L} = -\frac{G_F}{\sqrt{2}} \sum_{i=u,d} [C_{1i} \bar{e} \gamma_\mu \gamma^5 e \bar{q}_i \gamma^\mu q_i + C_{2i} \bar{e} \gamma_\mu e \bar{q}_i \gamma^\mu \gamma^5 q_i]. \quad (75)$$

Finally, in the expression for the branching ratio of $K_L \to \pi^0 \nu \bar{\nu}$, the charm contribution can be neglected, resulting in

$$\mathrm{Br}(K_L \to \pi^0 \nu \bar{\nu}) = r_{K_L} \frac{\tau_{K_L}}{\tau_{K^+}} \mathrm{Br}(K^+ \to \pi^0 e^+ \bar{\nu}) \times \frac{3\alpha^2}{2\pi^2 s_W^4 |V_{us}|^2} [\eta_t^X X_0(x_t) \mathrm{Im}\, \lambda_{sd}^t + \mathrm{Im}\, \Delta_{K^+}]^2, \quad (77)$$

where the correct value of the branching ratio for $K^+ \to \pi^0 e^+ \bar{\nu}$ is $\mathrm{Br}(K^+ \to \pi^0 e^+ \bar{\nu}) = 0.0487$ (in the calculations the correct value was used).

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