Erratum

Erratum to: $U(1)_{B_3-L_2}$ explanation of the neutral current $B-$anomalies

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Erratum to: Eur. Phys. J. C (2021) 81:56
https://doi.org/10.1140/epjc/s10052-021-08855-w

An error in the neutrino trident expression (21) is fixed, with consequent changes to (22) and Figs. 8 and 9. All other results and conclusions remain unchanged.

1 Neutrino trident process

In the original article, the constraint from the neutrino trident process (21) should instead read

$$\frac{\sigma_{(B_3-L_2)\text{eg}}}{\sigma_{SM}} = \frac{1 + (1 + 4s_W^2 + 18v^2 g_{Z'}^2/M_{Z'}^2)^2}{1 + (1 + 4s_W^2)^2}. \tag{21}$$

A term in the numerator was missing in the original paper. This has the following knock-on effects: (22) is correctly

$$g_{Z'}\frac{\text{TeV}}{M_{Z'}} \le 0.62, \tag{22}$$

and changes the position of the neutrino trident bound in Figs. 8, 9, which should be replaced with the ones shown here.

No other changes to the original manuscript result and the conclusions are unchanged.
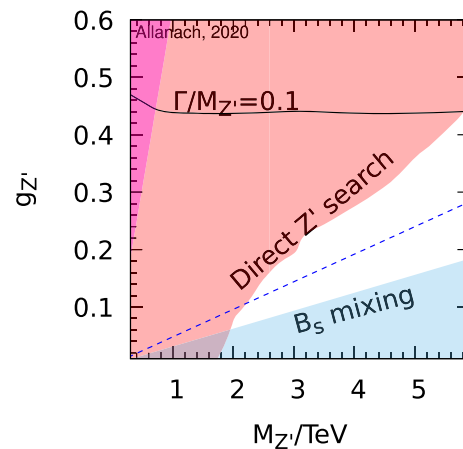
Fig. 8 Constraints upon $(B_3 - L_2)$eg for $M_{Z'} > 300$ GeV. $\sin 2\theta_{sb}$ has been set as in (18) such that every point fits the NCBAs. The white region is currently allowed. The red and blue coloured regions show the 95% excluded regions from a 13 TeV 139 fb^{-1} ATLAS $Z' \to \mu^+\mu^-$ search [77] and from $B_s - \overline{B_s}$ mixing as in (20), respectively. The latter bound moves from the blue coloured region at lower $C_9 = -0.65$ to the region below the dashed line for central $C_9 = -0.97$. The magenta region in the top left-hand corner shows the region ruled out by the neutrino trident process. The direct search bound is extrapolated above the solid curve and interpolated between ATLAS data below it, according to (28)

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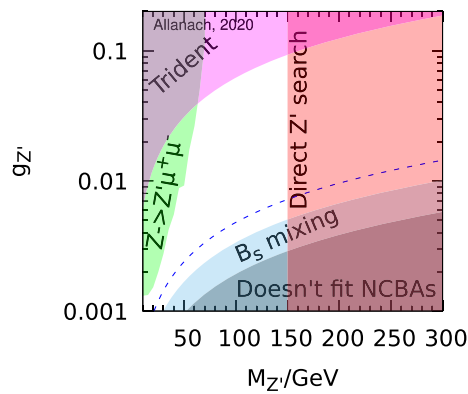
Fig. 9 Constraints upon $(B_3 - L_2)$eg for $M_{Z'} \leq 300$ GeV. $\sin 2\theta_{sb}$ has been set as in (18) such that every point fits the NCBAs. The white region is currently allowed. The red and blue coloured regions show the 95% excluded regions from a 13 TeV 36.1 fb^{-1} ATLAS $Z' \to \mu^+\mu^-$ search [77] and from $B_s - \overline{B_s}$ mixing as in (20), respectively. The latter bound moves from the blue coloured region at lower $C_9 = -0.65$ to the region below the dashed line for central $C_9 = -0.97$. The magenta region shows the region ruled out by the neutrino trident process and the green region by a CMS search in 77.3 fb^{-1} of 13 TeV pp collisions for $Z^0 \to \mu^+\mu^- Z' \to 4\mu$ [72]. In the grey region at the bottom of the plot, the effect of the Z' on the NCBAs is too weak to fit them