Erratum

A Search for Leptoquark Bosons and Lepton Flavour Violation in e^+p Collisions at HERA

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The production of the tables of constraints for lepton flavour violating leptoquarks when involving τ leptons was technically affected by a misreading of efficiencies in the case of vector (scalar) leptoquarks with fermion number $F = 0$ ($F = 2$). The corrected Fig. 19 and Fig. 20 are given below.

$e \longleftrightarrow \tau$ **F = 0**

BEST EXCLUSION UPPER LIMITS ON $\frac{\lambda_{1i}\ \lambda_{3j}}{M^2_{LQ}}$ (in 10^{-4} GeV^{-2})

FOR LEPTON FLAVOUR VIOLATING LEPTOQUARKS

$q_i\ q_j$	$S_{1/2,L}$	$S_{1/2,R}$	$\tilde{S}_{1/2,L}$	$V_{0,L}$	$V_{0,R}$	$\tilde{V}_{0,R}$	$V_{1,L}$
1 1	$\tau \to \pi e$ 0.0032 H1: 0.046	$\tau \to \pi e$ 0.0016 H1: 0.037	$\tau \to \pi e$ 0.0032 H1: 0.062	G_F 0.002 H1: 0.049	$\tau \to \pi e$ 0.0016 H1: 0.049	$\tau \to \pi e$ 0.0016 H1: 0.041	G_F 0.002 H1: 0.019
1 2	ZEUS: 0.12 H1: 0.047	$\tau \to K e$ 0.05 H1: 0.038	$\tau \to K e$ 0.05 H1: 0.063	$\tau \to K e$ 0.03 H1: 0.053	$\tau \to K e$ 0.03 H1: 0.053	ZEUS: 0.10 H1: 0.045	$K \to \pi \nu \bar{\nu}$ 2.5×10^{-6} H1: 0.021
1 3	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.065	$B \to \tau \bar{e} X$ 0.08 H1: 0.065	$B \to l \nu X$ 0.02 H1: 0.062	$B \to \tau \bar{e} X$ 0.04 H1: 0.062	*	$B \to l \nu X$ 0.02 H1: 0.062
2 1	ZEUS: 0.34 H1: 0.15	$\tau \to K e$ 0.05 H1: 0.095	$\tau \to K e$ 0.05 H1: 0.12	$\tau \to K e$ 0.03 H1: 0.064	$\tau \to K e$ 0.03 H1: 0.064	ZEUS: 0.10 H1: 0.073	$K \to \pi \nu \bar{\nu}$ 2.5×10^{-6} H1: 0.032
2 2	$\tau \to e\gamma$ 0.03 H1: 0.18	$\tau \to e\gamma$ 0.02 H1: 0.10	ZEUS: 0.48 H1: 0.13	ZEUS: 0.25 H1: 0.076	ZEUS: 0.25 H1: 0.076	ZEUS: 0.31 H1: 0.107	ZEUS: 0.13 H1: 0.044
2 3	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.14	$B \to \tau \bar{e} X$ 0.08 H1: 0.14	$B \to l \nu X$ 0.02 H1: 0.112	$B \to \tau \bar{e} X$ 0.04 H1: 0.112	*	$B \to l \nu X$ 0.02 H1: 0.112
3 1	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.16	$B \to \tau \bar{e} X$ 0.08 H1: 0.16	V_{ub} 0.002 H1: 0.068	$B \to \tau \bar{e} X$ 0.04 H1: 0.068	*	V_{ub} 0.002 H1: 0.068
3 2	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.19	$B \to \tau \bar{e} X$ 0.08 H1: 0.19	$B \to l \nu X$ 0.02 H1: 0.083	$B \to \tau \bar{e} X$ 0.04 H1: 0.083	*	$B \to l \nu X$ 0.02 H1: 0.083
3 3	*	ZEUS: 0.72 H1: 0.23	ZEUS: 0.72 H1: 0.23	$\tau \to e\gamma$ 0.51^{Z} H1: 0.14	$\tau \to e\gamma$ 0.51^{Z} H1: 0.14	*	ZEUS: 0.38 H1: 0.14

Figure 19: Rejection limits on $\lambda_{1i}\lambda_{3j}/M^2_{LQ}$ in units of 10^{-4} GeV^{-2} for $F = 0$ leptoquarks, compared to constraints from indirect processes. The first column indicates the generations of the quarks q_i and q_j coupling respectively to $LQ - e$ and $LQ - \tau$. In each box, the process which provides a most [22] stringent indirect constraint is listed (first line) together with its exclusion limit (second line) and compared to the actual H1 result (third line). For the $\tilde{S}_{1/2,L}$, which does not couple to the neutrino, limits on $\lambda_{11} \times \lambda_{32}$ and on $\lambda_{12} \times \lambda_{31}$ derived in [22] from $K \to \pi\nu\bar{\nu}$ have been replaced by the bounds obtained from $\tau \to Ke$. Shadowed boxes emphasize where HERA limit is comparable to (within a factor of 2) or better than the indirect constraints. The superscripts Z indicate where earlier HERA [13] results already improved indirect bounds. The open boxes marked with a $*$ are cases which would involve a top quark.

$e \longleftrightarrow \tau$							$F = 2$
BEST EXCLUSION UPPER LIMITS ON $\frac{\lambda_{1i}\,\lambda_{3j}}{M^2_{LQ}}$ (in 10^{-4} GeV^{-2}) FOR LEPTON FLAVOUR VIOLATING LEPTOQUARKS							
$q_i\ q_j$	$S_{0,L}$	$S_{0,R}$	$\tilde{S}_{0,R}$	$S_{1,L}$	$V_{1/2,L}$	$V_{1/2,R}$	$\tilde{V}_{1/2,L}$
1 1	G_F 0.003 H1: 0.082	$\tau \to \pi e$ 0.0032 H1: 0.082	$\tau \to \pi e$ 0.0032 H1: 0.097	G_F 0.003 H1: 0.042	$\tau \to \pi e$ 0.0016 H1: 0.030	$\tau \to \pi e$ 8×10^{-4} H1: 0.018	$\tau \to \pi e$ 0.0016 H1: 0.023
1 2	$K \to \pi \nu \bar{\nu}$ 10^{-5} H1: 0.146	ZEUS: 0.20 H1: 0.146	$\tau \to K e$ 0.05 H1: 0.129	$K \to \pi \nu \bar{\nu}$ 10^{-5} H1: 0.059	$K \to \pi \nu \bar{\nu}$ 5×10^{-6} H1: 0.060	$\tau \to K e$ 0.03 H1: 0.048	ZEUS: 0.16 H1: 0.078
1 3	V_{bu} 0.004	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.138	V_{bu} 0.004 H1: 0.069	$B \to \tau \bar{e} X$ 0.04 H1: 0.084	$B \to \tau \bar{e} X$ 0.04 H1: 0.084	*
2 1	$K \to \pi \nu \bar{\nu}$ 10^{-5} H1: 0.089	ZEUS: 0.22 H1: 0.089	$\tau \to K e$ 0.05 H1: 0.106	$K \to \pi \nu \bar{\nu}$ 10^{-5} H1: 0.046	$K \to \pi \nu \bar{\nu}$ 5×10^{-6} H1: 0.031	$\tau \to K e$ 0.03 H1: 0.018	ZEUS: 0.06 H1: 0.023
2 2	$\tau \to e \gamma$ 0.075 H1: 0.211	$\tau \to e \gamma$ 0.075 H1: 0.211	$\tau \to e \gamma$ 0.045 H1: 0.151	$\tau \to e \gamma$ 0.015 H1: 0.071	ZEUS: 0.25 H1: 0.064	ZEUS: 0.19 H1: 0.053	ZEUS: 0.31 H1: 0.091
2 3	$B \to l \nu X$ 0.04	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.167	$B \to l \nu X$ 0.04 H1: 0.083	$B \to \tau \bar{e} X$ 0.04 H1: 0.095	$B \to \tau \bar{e} X$ 0.04 H1: 0.095	*
3 1	$B \to l \nu X$ 0.04	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.123	$B \to l \nu X$ 0.04 H1: 0.061	$B \to \tau \bar{e} X$ 0.04 H1: 0.031	$B \to \tau \bar{e} X$ 0.04 H1: 0.032	*
3 2	$B \to l \nu X$ 0.04	*	$B \to \tau \bar{e} X$ 0.08 H1: 0.218	$B \to l \nu X$ 0.04 H1: 0.109	$B \to \tau \bar{e} X$ 0.04 H1: 0.071	$B \to \tau \bar{e} X$ 0.04 H1: 0.071	*
3 3		*	$\tau \to e \gamma$ 0.045 H1: 0.272	$\tau \to e \gamma$ 0.015 H1: 0.136	ZEUS: 0.38 H1: 0.120	ZEUS: 0.38 H1: 0.12	*

Figure 20: Rejection limits on $\lambda_{1i}\lambda_{3j}/M^2_{LQ}$ in units of 10^{-4} GeV^{-2} for $\mid F \mid = 2$ leptoquarks, compared to constraints from indirect processes. The first column indicates the generations of the quarks q_i and q_j coupling respectively to $LQ - e$ and $LQ - \tau$. In each box, the process which provides a most [22] stringent indirect constraint is listed (first line) together with its exclusion limit (second line) and compared to the actual H1 result (third line). Shadowed boxes emphasize where HERA limit is comparable to (within a factor of 2) or better than the indirect constraints. The open boxes marked with a $*$ are cases which would involve a top quark.