

for $U(1)_B$ $N=6$ $(1, -2, -3, 5, 5, -6)$

ν_e χ_e χ_e^\dagger σ_1 σ_2 S $L_L'^\dagger$ e_R' L_R'' $e_L''^\dagger$ Q^\dagger u d
 5 -3 -2 $+1$ $+6$ -5 $+1$ -1 -6 $+6$ $5/9$ $-5/9$ $-5/9$

Field	$SU(2)_L$	$U(1)_Y$	$U(1)_D$
u_{Ri}	1	2/3	$u = -5/9$
d_{Ri}	1	-1/3	$d = -5/9$
$(Q_i)^\dagger$	2	-1/6	$Q = 5/9$
$(L_i)^\dagger$	2	1/2	$L = 0$
e_R	1	-1	$e = 0$
$(L_L')^\dagger$	2	1/2	$-x' = 1$
e_R'	1	-1	$x' = -1$
L_R''	2	-1/2	$x'' = -6$
$(e_L'')^\dagger$	1	$+x = 1$	$-x'' = 6$
χ_α	1	0	$z_\alpha \rightarrow \nu_e = 5, \chi_e = -3, \chi_e^\dagger = -2$

S 1 0 -5
 σ_1 1 1 1
 σ_2 1 1 6

$$\begin{aligned}
 \mathcal{L} \supset & y_1 \bar{L}_L' L \sigma_1^* + y_2 \bar{e}_R' L H + y_3 \bar{\nu}_R e_R' \sigma_2 + m_1 S^* \sigma_2^* \sigma_1 + m_{\sigma_1} \sigma_1^* \sigma_1 + m_{\sigma_2} \sigma_2^* \sigma_2 \\
 & + y_4 \bar{L}_R'' e_L' H + y_{\chi S} \bar{\chi}_R \chi_L S + y_{\chi \Phi} \bar{\chi}_R \chi_L \Phi + \lambda_{L\Phi} \bar{L}_R'' L_L' \Phi + \lambda_{e\Phi} \bar{e}_R' e_L'' \Phi^* + \lambda_{LS} \bar{L}_R'' L_L' S \\
 & + \lambda_{eS} \bar{e}_R' e_L'' S^* + \text{h.c.} \\
 & + \text{quartic terms combining } \sigma_i, S, \Phi
 \end{aligned}$$