In the ALRM, since $v_6 = 0$, M_{W_R} takes the value of the upper limit of this range. The prediction of $W_R^\pm$ in addition to Z' distinguishes these two models from the multitude of other proposals with an extra $U(1)'$ gauge symmetry.

V. Z' DECAY

Consider the possible discovery of Z' at the LHC. For $M_{Z'} = 1$ TeV, only an integrated luminosity of 0.2 fb^{-1} is required [1]. Its discovery channel is presumably $\mu^+\mu^-$, but it will also have 4 charged muons in the final state from $\Delta_R^{++}\Delta_R^{--}$, and perhaps even 8 charged muons, as shown below.

In addition to all SM particles, Z' also decays into $n\bar{n}$, $\Delta_R^{++}\Delta_R^{--}$, $\xi_R^+\xi_R^-$, $A_R^0 H_{R1}^0$, $H_L^+ H_L^-$, and $A_L^0 H_L^0$. In particular, the subsequent decay $\Delta_R^{\pm\pm} \to \mu^\pm\mu^\pm$ will be a unique signature where the like-sign dimuons have identical invariant masses [1].

The interactions of Z' with fermions come from

$$\mathcal{L} = -g' Z'_\mu J^\mu_{Z'}, \tag{27}$$

where $g' = e/\sqrt{x(1-x)(1-2x)}$. Ignoring fermion masses, each fermionic partial width is given by

$$\Gamma(Z' \to \bar{f}f) = \frac{(g')^2 M_{Z'}}{24\pi}[c_L^2 + c_R^2], \tag{28}$$

where $c_{L,R}$ are the coefficients from $J_{Z'} = xJ_{3L} + (1-x)J_{3R} - xJ_{em}$, and a color factor of 3 should be added for each quark. In the DLRM, we have

$$u_L = -\frac{x}{6}, \quad u_R = \frac{1}{2} - \frac{7x}{6}, \quad d_L = -\frac{x}{6}, \quad d_R = \frac{x}{3}, \tag{29}$$

$$\nu_L = \frac{x}{2}, \quad n_R = \frac{1-x}{2}, \quad e_L = \frac{x}{2}, \quad e_R = -\frac{1}{2} + \frac{3x}{2}. \tag{30}$$

Here we need to consider 3 families for u, d, ν, e but only one for n.

The decay of $Z' \to A_R^0 H_{R1}^0$ to scalars come from

$$\mathcal{L} = -g'(1-x) Z'_\mu [(\partial^\mu H_{R1}^0) A_R^0 - (\partial^\mu A_R^0) H_{R1}^0], \tag{31}$$

with the partial decay width

$$\Gamma(Z' \to A_R^0 H_{R1}^0) = \frac{(g')^2 M_{Z'}(1-x)^2}{48\pi}, \tag{32}$$

[1] Not all models involving doubly charged scalars have this decay, see for example [11].