

225(6): Numerous Sequential Errors in HWS Theory.

From Q last note:

$$D_\mu \phi = -\frac{i}{2} \left[g \left(\eta + \frac{\sigma}{\sqrt{2}} \right) (W_\mu^1 - iW_\mu^2) \right. \\ \left. i\sqrt{2} D_\mu \phi - \eta (gW_\mu^3 + g'X_\mu) - \frac{\sigma}{\sqrt{2}} (gW_\mu^3 + g'X_\mu) \right] \quad (1)$$

so:

$$(D_\mu \phi)^\dagger = \frac{i}{2} \left[g \left(\eta + \frac{\sigma}{\sqrt{2}} \right) (W_\mu^1 + iW_\mu^2), -i\sqrt{2} D_\mu \phi - \eta (gW_\mu^3 + g'X_\mu) \right. \\ \left. - \frac{\sigma}{\sqrt{2}} (gW_\mu^3 + g'X_\mu) \right] \quad (2)$$

Therefore:

$$(D_\mu \phi)^\dagger (D_\mu \phi) = \frac{1}{2} (D_\mu \phi)^2 + g^2 \left(\eta + \frac{\sigma}{\sqrt{2}} \right)^2 (W_\mu^{12} + W_\mu^{32}) \\ + \frac{\eta^2}{4} (W_\mu^3 + g'X_\mu)^2 + \frac{\sigma^2}{8} (gW_\mu^3 + g'X_\mu)^2 \quad (3)$$

The result given by Ryder is eq. (9.80) of the second edition and is incorrect:

$$(D_\mu \phi)^\dagger (D_\mu \phi) = \frac{1}{2} (D_\mu \phi)^2 + \frac{g^2 \eta^2}{4} (W_\mu^{12} + W_\mu^{22}) \\ + \frac{\eta^2}{4} (gW_\mu^3 - g'X_\mu)^2 + \dots \quad (4)$$

2) The neutral current Z_μ is incorrectly defined

as:

$$Z_\mu = \frac{g W_\mu^3 - g' X_\mu}{(g^2 + g'^2)^{1/2}} \quad - (5)$$

from the incorrect dotted term in eq. (4). The Weisberg angle is introduced as:

$$\cos \theta_W = \frac{g}{(g^2 + g'^2)^{1/2}} \quad - (6)$$

from a claimed "normalization".

As shown in previous work the correct evaluation of the leptonic term is:

$$\begin{aligned} & i \bar{R} \gamma^\mu (\partial_\mu + i g' X_\mu) R + i \bar{L} \gamma^\mu \left(\partial_\mu + \frac{i}{2} g' X_\mu - \frac{i}{2} g \frac{\tau \cdot W_\mu}{} \right) L \\ &= -g' X_\mu \bar{e}_R \gamma^\mu e_R - \left(\frac{g'}{2} X_\mu + \frac{g}{2} W_\mu^3 \right) \bar{e}_L \gamma^\mu e_L \\ & \quad + \dots \end{aligned} \quad - (7)$$

but Ryder gives this result in his eq. (9.85) as:

$$\begin{aligned} &= i \bar{e} \gamma^\mu \partial_\mu e - g \sin \theta_W \bar{e} \gamma^\mu e A_\mu \\ &+ \frac{g}{\cos \theta_W} Z_\mu \left(\sin^2 \theta_W \bar{e}_R \gamma^\mu e_R - \frac{\cos 2\theta_W}{2} \bar{e}_L \gamma^\mu e_L \right) \\ &+ \dots \end{aligned} \quad - (8)$$

3) Eq. (8) bears no resemblance at all to eq. (7),
and in eq. (8), the wavefunction e is completely
undefined.

It is claimed in GWS theory that:

$$A_\mu = \frac{g' W_\mu^3 + g X_\mu}{(g^2 + g'^2)^{1/2}} \quad - (9)$$

but with this definition in eq. (8) does not
produce anything resembling eq. (7).

On the basis of these gross algebraic errors
it is claimed that:

$$e = g \sin \theta_W \quad - (10)$$

where e is the charge of the proton.

The rest of GWS theory is obviously
erroneous sequentially, and entirely meaningless.

The peaks found in the UAI Collaboration,
if they exist, must be reinterpreted completely.