Contradictions of the ElectroWeak Theory

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Further arguments substantiate the claim of this text. They are shown briefly at the end of this original text of 2012, together with adequate references.

The density of the $W^{\pm}, Z$ particles is examined. Density is the 0-component of a particle's 4-current. Therefore, the structure of the 4-current of these particles is analyzed and it is shown that the $W^{\pm}$ bosons cannot carry electric charge. An expression for the $W^{\pm}, Z$ 4-current is (see [1], p. 12)

$$j^{\nu}_{\alpha} = -F_{\gamma}^{\;\nu\mu} C_{\gamma\alpha\beta} A_{\beta\mu} + j^{\nu}_{fermions}. \tag{1}$$

Here μ, ν denote indices used in Minkowski space, α, β, γ run on generators of the symmetry group and $C_{\gamma\alpha\beta}$ are the structure constants of this group. $A_{\beta\mu}$ and $F_{\gamma}^{\;\nu\mu}$ are a 4-vector and an antisymmetric 4-tensor which correspond to the electromagnetic 4-potential and the fields' 4-tensor, respectively. $j^{\nu}_{fermions}$ denotes the 4-current of the Dirac-like spin-1/2 particles with which the $W^{\pm}, Z$ interact. The fermions' 4-current $j^{\nu}_{fermions}$ is independent of the functions that represent the $W^{\pm}, Z$ bosons. (Note that an addition of the boson's mass term (see [1], p. 309) to the Lagrangian density does not alter (1). Indeed, the mass term does not contain derivatives and the Noether theorem proves this point.) The 4-current (1) satisfies the continuity equation (see [1], p. 12)

$$\partial_{\nu} j^{\nu}_{\alpha} = 0. \tag{2}$$

As is well known, the validity of this equation is a necessary condition for a self-consistent 4-current. However, it is proved below that (2) is *not* a sufficient condition for a self-consistent 4-current.

Let us examine the first term of (1). The structure constants $C_{\gamma\alpha\beta}$ are antisymmetric with respect an interchange of α and β (see [1], p. 3). Hence, $C_{\gamma\alpha\beta} = 0$ if $\alpha = \beta$. It means that in (1) a nonzero density of a positively charged W^+ depends on the existence of a neutral or a negatively charged member of the $W^\pm$, Z multiplet at the W^+ location. This is a contradiction, because a W^+ is generally produced in circumstances where neither W^- nor Z exists at its location. This conclusion proves that the density of $W^\pm$ vanishes throughout the entire 3-dimensional space and for this reason $W^\pm$ cannot carry an electric charge.

This contradiction is removed if one regards the $W^\pm, Z$ not as elementary pointlike particles that play the role of a field that carries the weak interactions but as ordinary top quark mesons. In this case these particles are a bound state of a quark-antiquark pair. A wave function of such a pair depends on *two* sets of four space-time coordinates. Evidently, a field function of an elementary particle like $\phi(x^\mu)$, which is used in a Lagrangian density, cannot describe a meson simply because $\phi(x^\mu)$ lacks the right number of independent coordinates. Therefore, the $W^\pm$ are a superposition of a top quark and of one of the d, s, b antiquarks (or vice versa); analogously, the Z is a superposition of the top quark and one of the u, c antiquarks and the new 125 GeV particle is a top-antitop meson. The top quark, the $W^\pm$, the Z and the new 125 GeV particle have a similar width of about 2 GeV. These data indicate that these particles share a common element, which is the flavor changing weak decay of the top quark. By contrast, Standard Model calculations predict for a 125 GeV Higgs boson a width which is three orders of magnitude smaller than the present experimental value (compare [2], pp. 143, 145 with the width shown in [3]). Another inconsistency of the electroweak theory is discussed elsewhere [4].

Further erroneous elements of the electroweak theory are pointed out below.

1. See items 1, 3 of [5].

2. These articles discuss uncorrectable electroweak errors [6, 7, 8]

References

[1] S. Weinberg, *The Quantum Theory of Fields*, Vol. II, (Cambridge University Press, Cambridge, 1996).

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