Theoretical Prediction of the Electroweak Mixing Angle

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Abstract

Ether theory naturally provides two coupling constants, and they are apparently related by the electroweak mixing angle.

Keywords

Unified Field Theories, Glashow-Weinberg-Salam Model, Standard Model.

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An ether theory has previously been published which claims to account for the fine structure constant [1][2]. In this paper it is shown that ether theory also accounts for the coupling strength of weak hypercharge, and so is capable of predicting the electroweak mixing angle.

There are two conditions in the ether :-

The first condition is that each and every lattice particle has zero interaction energy. This condition is given by the equation

$$8\pi(r/d)^2 + [\int e\sigma/x \, dv + \sum e^2/x]d/e^2 + (d/r)^4/4996\pi = 0 \qquad (1)$$

where

$$\int e\sigma/x \, dv + \sum e^2/x = - 2.31370 \, e^2/d \qquad (2)$$

Equations (1) and (2) are derived in the literature, and lead to the result

$(r/d) = 0.302916$

$\alpha^{-1} = 144\pi(r/d) = 137.036$

The second condition is that the total interaction energy in the ether is zero. This condition is given by the equation

$$8\pi(r/d)^2 + [\int e\sigma/x \, dv + \sum e^2/2x + \int\int \sigma^2/2x \, dvdv]d/e^2$$

$$+ (d/r)^4_{elec}/4996\pi = 0 \qquad (3)$$

where

$(d/r)_{elec} = 0.302916^{-1}$

and

$$\int e\sigma/x \, dv + \sum e^2/2x + \int\int \sigma^2/2x \, dvdv = - [(2.31370 + \pi/6)/2]e^2/d \quad (4)$$

Equations (3) and (4) lead to the result

$(r/d) = 0.236950$

$\alpha_Y^{-1} = 144\pi(r/d) = 107.194$

This is recognizable as the coupling strength for weak hypercharge [3].

To derive equation (4) we conclude that since ether crystals are sheetlike in shape with one linear dimension very much smaller than the other two

$$[\int e\sigma/x \, dv + \int\int \sigma^2/x \, dvdv]d/e^2 = -\, 8\pi\int_0^{d/4}(r/d)^2 \, dr \,/ \int_0^{d/4} dr$$

$$= -\, 8\pi(1/48) \qquad (5)$$

This is the average value of $- 8\pi(r/d)^2$ over the range $r = 0$ to $r = d/4$

Equation (4) then follows from equations (2), (3) and (5)

The electroweak mixing angle at low energy is given by

$\mathrm{Sin}^2\theta_0 = (137.036 - 107.194)/137.036 = 0.21777$

There has been a lot of effort in recent years to obtain high-precision data at the Z-pole (91.1875 Gev) [4][5][6][7][8][9][10][11][12].

To calculate the electroweak mixing angle at the Z-pole we use the value

$\alpha^{-1}_{Mz} = 128.923 \pm 0.036$

given in [6] and so obtain

$\mathrm{Sin}^2\theta_{eff} = (137.036 - 107.194)/128.923 = 0.23147$

This result lies nicely within the world experimental average [11]

$\mathrm{Sin}^2\theta_{eff} = 0.23146 \pm 0.00017$

The chance that ether theory should yield both the 137 and 107 numbers would appear to be only one part in about 14,000. This suggests that ether theory must be correct.

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