85(9): Anomalous g factor of the Electron.

From ECE theory:

$$g = 2\left(1+\frac{\alpha}{4\pi}\right)^2 = 2 + \frac{\alpha}{\pi} + \frac{\alpha^2}{8\pi^2} \quad -(1)$$

From basic definition:

$$\alpha = \frac{e^2}{4\pi\epsilon_0 \hbar c} \quad -(2)$$

The fundamental constants may be taken from www.nist which is the site of the US National Institute for Standards and Technology, one of the world's standard laboratories. They are:

$$g\,(\text{expt.}) = 2.0023193043718 \pm 0.0000000000075$$

$$\hbar\,(\text{expt}) = (6.6260693 \pm 0.0000011) \times 10^{-34}\ \text{Js}$$

$$e\,(\text{expt}) = (1.60217653 \pm 0.00000014) \times 10^{-19}\ \text{C}$$

$$c\,(\text{exact}) = 2.99792458 \times 10^{8}\ \text{m s}^{-1}$$

$$\epsilon_0\,(\text{exact}) = 8.854187817 \times 10^{-12}\ \text{J}^{-1}\text{C}^2\text{m}^{-1}$$

$$\mu_0\,(\text{exact}) = 4\pi \times 10^{-7}\ \text{J s}^2\text{C}^{-2}\text{m}^{-1}$$

Here:

$$\epsilon_0\mu_0 = \frac{1}{c^2}. \quad -(3)$$

We use:

$$\pi = 3.14159265359 0. \quad -(4)$$

If eq (2) is used to calculate α from the above fundamental constants:

$$\alpha = 0.00729734 \quad -(5)$$

where we [illegible]

2) This rounding off is required because the uncertainty in α is determined by ~~the~~ the uncertainty of its least precise constant, which is h:

$$h(\text{exptl}) = (6.626069(3) \pm 0.000\,0011) \times 10^{-34} \; Js. \quad -(6)$$

Thus h is given to six decimal places and seven figures, i.e. 6.626069. So α is given to the same precision, $\alpha = 0.0072297(34)$. The Planck constant h is determined experimentally to this precision.

If eq. (5) is used in eq. (1) to determine g ~~theoretically~~ from ECE, we obtain:

$$g(ECE) = 2.002323(49) \quad -(7)$$

where we have again rounded off to six decimal places. The experimental value of g is known to twelve decimal places, and is six orders of magnitude more precise than h:

$$g(\text{exptl.}) = 2.00231930437118 \pm 0.000\,000\,000\,0075 \quad -(8)$$

It is not possible to obtain g ~~theoretically~~ to a greater precision than eq. (7), because of eq. (6). It is seen that the difference between eq. (8) and (7) is:

$$\boxed{g(ECE) - g(\text{exptl.}) = 0.00004} \quad -(9)$$

which is the same order of magnitude as the uncertainty in $h(\text{exptl})$ from eq. (6). So ECE fits the data to within experimental uncertainty.

3) Inconsistencies in the Standard Model Literature

Planck Constant h

This is given by P. W. Atkins, "Molecular Quantum Mechanics" (Oxford Univ. Press, 1983, 2nd. ed.) as:

$$h(\text{Atkins}) = 6.62618 \times 10^{-34} \text{ Js} \quad -(10)$$

and this is different in the fourth decimal place from the NIST eq. (6). Despite this, Atkins gives:

$$\alpha(\text{Atkins}) = 0.007297351 \quad -(11)$$

which is different from eq (5) only in the eighth decimal place. This is a major inconsistency in the standard model literature.

g Factor

Atkins gives this on page 216:

$$g(\text{Atkins}) = 2.002319314 \quad -(12)$$

This is different from the NIST value in the eighth decimal place, while it is claimed that g (experimental) from eq. (8) is accurate to the twelfth decimal place. This is another major inconsistency in the standard model literature

Ryder gives this on p. 345 (2nd ed.):

$$g(\text{Ryder}) = 2.0023193048 \quad -(13)$$

which differs from the NIST value in the tenth decimal place.

4). Ryder then claims that QED is accurate to the tenth decimal place. However, QED is expressed in terms of α, and cannot be more accurate than $\hbar$ (eq. (6)). For example:

$$g\,(\text{Schwinger}) = 2 + \frac{\alpha}{\pi} \quad -(14)$$

which is obviously expressed in terms of α.

<u>Summary of Some g Factors</u>

$$\boxed{\begin{aligned} g\,(\text{Schwinger}) &= 2 + \frac{\alpha}{\pi} = 2.002322(8) \\ g\,(\text{ECE}) &= 2 + \frac{\alpha}{\pi} + \frac{\alpha^2}{8\pi^2} = 2.002323(49) \\ g\,(\text{NIST}) &= 2.00231930436718 \pm 0.000\,000\,000\,0075 \\ g\,(\text{Atkins}) &= 2.002319314 \pm (?) \\ g\,(\text{Ryder}) &= 2.002319304 8 \pm (?) \end{aligned}}$$

<u>Fine Structure Constant</u>

The most serious internal inconsistency in the standard model literature is the fine structure constant. This is claimed at NIST to be ~~theoretically~~ and experimentally as follows:

$$\alpha = (7.297352560 \pm 0.000\,000\,024) \times 10^{-3} \quad -(15)$$

5)

The first thing to note is that this claim, eq. (15) is different to the eighth decimal place from eq. (5), which is calculated from NIST's own fundamental constants. Yet it is claimed that eq. (15) is accurate to the tenth decimal place. However, from eq. (6) it is seen that the accuracy of $\hbar$ is only to the sixth decimal place, a major internal inconsistency of four orders of magnitude.

It is claimed that QED produces this result (15), which is an obvious internal inconsistency because QED is limited by the uncertainty of $\hbar$. In QED an electron emits a virtual photon, which emits virtual electron positron pairs. The virtual positron is attracted to the electron, the virtual electron is repelled from the electron. In QED the fine structure constant is the square of the completely screened charge, a value calculated at infinite distance or limit of zero momentum transfer. The virtual photons, electrons and positrons are entities which cannot be directly observed and which do not obey the rules of special relativity. QED is further beset with problems of singularities, which are removed by an artificial process of renormalization. The perturbation expansion in QED is, furthermore, arbitrarily subjected to a cut off and is not known to converge. At high energies α is 1/128, i.e. varies by many orders of magnitude greater than the claimed precision of eq. (15).

The huge complexity of QED is removed entirely by ECE, which uses simple and basic ideas. For example, ECE produces the Schwinger result exactly to first order in α, and also improves it to second order, without any of the convoluted complexity of ~~that~~ Schwinger method.

Another serious inconsistency appears in the NIST website when it is claimed that eq. (15) is produced experimentally by the quantum Hall effect. There are at least two immediate problems with this claim. The first is the use of the von Klitzing constant:

$$R_K = \frac{h}{e^2} = \frac{\mu_0 c}{2\alpha} \quad - (16)$$

This is again constrained by the accuracy of h in eq. (6). This is nowhere near the accuracy claimed for α from eq. (16). If eq. (15) were really true, then h and e would be known to ten decimal places, whereas h is known only to six decimal places and e to seven decimal places by NIST's own literature. The second problem is that a calculable cross capacitor is needed to measure the standard resistance before the quantum Hall effect can be used to give α. The claim (15) is therefore just nonsense.