CHAPTER 4

The Creation of the Proton

Introduction

In this chapter we will address the problem of proton creation. The proton is the most fundamental particle in the composition of matter. Our task here is to explain how it is created and how similar creation processes attempt to create other particles that we only glimpse by their transient existence.

The proton is indeed very special as there is something unique about the conditions under which it is created, something which assures its stable existence. However, contrary to general belief, even a proton must have a finite lifetime, but in view of its creation propensity its decay is followed by its immediate re-creation and so it appears to be immune from decay. It is the same for the electron, but we can infer a measure of its lifetime from its ability to tunnel across potential barriers.

The starting point in this account is the activity of the virtual muon system that populates all space. The muon is a lepton form intermediate the taon and the electron. It decays to form the electron but it can also, in its game play with other muons, build the particle forms that include both the taon and the proton and, once created, those protons are survivors for the reason now to be explained.

The Proton Creation Formula

Earlier in this work there has been extensive use of the formula ascribed to J. J. Thomson for the mass-energy of a charge e

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confined within a sphere of a radius we here denote by the symbol x. The energy E is simply:

$$E = 2e^2/3x \quad \text{..... (4.1)}$$

If we now imagine that two such charges of opposite charge polarity but different radii x and y exist in surface contact, we see that their centres are separated by a distance (x+y). This means that the combination has an energy amounting to that of the two components as offset by the Coulomb interaction energy $e^2/(x+y)$.

Suppose now, given such a combination, that one charge, that of radius x is not susceptible to x changing in value but that the other charge can adapt by adjusting the radius y to suit some optimum energy condition. This is an electrostatic system and we are familiar with the energy of such systems seeking to minimize. Therefore, now let y change until the total energy of the combination is a minimum.

This will mean that:

$$-2e^2/3x^2 + e^2/(x+y)^2 = 0 \quad \text{..... (4.2)}$$

and so we find that y is equal to x times the square root of 3/2 minus 1 or 0.2247x.

The energy of the charge combination in this minimal energy state is then found to be even less than that of the stable charge of radius x by the small factor of 0.2247 squared or 0.0505, meaning that the overall combination has an energy slightly less than 95% of that stable charge.

The two-charge unit just described is electrically neutral and, with the dominant component having a mass-energy A and the dependant component having a mass-energy B, we now adopt the following expression to symbolize its energy:

$$(A:B)_{MIN}$$

that energy being 0.9495A.

Now suppose that a proton of energy P and charge +e has been created from the turmoil of excess energy in the aether that is seeking a state of equilibrium by deploying that energy into a

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standard particle form. Remember that in discussing the graviton in chapter 2 it was evident that the volume of the charge continuum displaced by the existence of the graviton bore a crucial relationship with the energy of that graviton. If that volume expands slightly, signifying a loss of some of that energy, there had to be other gravitons that absorbed that energy by contracting in equal measure. Such a scenario implies greater particle stability where all those particles have identical form.

In the aether the taon is one such particle form and in matter the proton is such a particle form. Then there is that ubiquitous virtual particle form, the muon of chapter 3, and its 'double', the dimuon now introduced, the mystery particles of the vacuum medium.

Once created the proton will be stable by virtue of its association with so many other protons of identical form, but the proton, along with other particles, can engage in a violent encounter if one of those muons or dimuons gets too close. The result is that an amount of energy z will be shed in a form nucleated by a charge +e but the muon or dimuon will escape unscathed to leave a neutral entity:

$$(P{:}k\mu)_{MIN}$$

where k is 1 or 2 and μ signifies the energy of the muon.

The existence of the dimuon is explained by considering the combination of two muons, one of charge +e and one of charge -e, with the energy being retained without loss in a neutral combination represented by:

$$(2\mu{:}\mu)$$

To understand this simply put y equal to 2x in the system described at the beginning of this section to signify that one charge has twice the radius and half the mass-energy of the other and you will see that the Coulomb interaction energy exactly cancels the energy of the second charge. The dimuon is a latent component in the neutral system transiently formed by muon pair combination.

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It seems possible therefore that k could be 2 and, keeping this in mind, we now write the equation:

$$(P{:}k\mu)_{MIN} + z = P \quad \text{..... (4.3)}$$

Given that the proton is somehow created and is a survivor, this equation is presumably one that is reversible in the sense that it says something about the creation of a positively charged particle z when P does get embroiled in a decay incident but it is equally a statement that has bearing upon how P is created. Somehow that particle of energy z has an independent origin and, if we can discover what that origin is, then we will discover the secret of proton creation.

Well, one can now utter the word "Eureka", because the answer is so obvious. In that (A:B) expression put A as 2μ as if we are considering that transiently neutral combination of a muon charge pair, but suppose the muon component B sheds energy to become z as that combination adopts its minimum energy state. One then has a neutral particle form of energy:

$$(2\mu{:}z)_{MIN}$$

This then becomes the target for attack by an odd number n of muons which drive out the z component and combine as a charge of energy P within the new neutral entity. The formulation of this is:

$$n\mu + (2\mu{:}z)_{MIN} = (P{:}k\mu)_{MIN} + z \quad \text{..... (4.4)}$$

We know the value of z from this latter step. It is 0.2247(2μ) and we also know from the earlier equation (4.3) that z is 0.0505(P), all of which merely tells us that:

$$P = 8.899(\mu) \quad \text{..... (4.5)}$$

which was evident anyway once k was seen to be 2 but the theory has relied on the assumption that P rather than the dimuon is the dominant partner in the neutral combination yielding this result.

That assumption has to be justified and it is here that the factor n comes into the picture. It sits in that two-stage equation (4.4) indicating that the major energy input needed for proton creation is a muon source but, absent verification, we have no assurance that its

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integer value n will give the now-expected answer, nor whether it will prove to be an odd integer.

Also there is so much scope in particle physics for energy discrepancies owing to Nature not complying with one's ideal theoretical portrayal that one would surely expect to find that some adjustment in regard to charge spacing or whatever will become necessary to satisfy the odd integer n requirement.

Now take note that the value of:

$$(2\mu{:}z)_{MIN}$$

is simply 0.9495 times 2μ or 1.899(μ) which tells us that precisely 7 muons have to be added to create the proton. It just so happens that the mathematics of all this works with such perfection in requiring n to be an odd integer that can only have the value 7 given the dimuon foundation.

It is an almost miraculous feature of the underworld activity of the aether medium that it has this truly amazing unique energy resonance property which causes a particle to form which locks its energy level at a unique value so precisely related to that of the prevalent lepton of the aether, the virtual muon.

In saying this I can but emphasize the fact that we have here the secret of the feature of Creation by which one, and only one, high mass-energy particle form has a dominating presence in matter. It is the proton family, by which I include the antiproton. The electron is equally prevalent but its existence is linked to the unique value of the universal rhythm of time, owing to its relatively low rest-mass-energy being that given by the frequency of the aether as multiplied by Planck's constant h, as will be discussed in chapters 6 and 7. Although physicists may argue that the neutron can claim also to be very prevalent in matter, I deny that claim, because the neutron has only been detected as a short-lived particle form, which decays into a proton and an electron. Its imagined existence in atomic nuclei is based solely on theory which pretends there is no aether and tries to balance the books accounting for mass and charge. An atomic

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nucleus having n units of charge and N units of mass is deemed to comprise n protons and N-n neutrons, but given the role played by the aether, with atomic nuclei having charges which meld into the aether particle lattice by adopting its structural form, one can imagine that atomic nucleus having n protons and N-n antiprotons, but with those antiprotons each having displaced a quon from its seat in the aether lattice. So, by understanding how protons are created in terms of aether activity, we are opening the way forward for a better understanding of the structure and composition of atomic nuclei. However, that is digressing from our main theme and we must get back on track.

Once we have derived from first principles the precise energy quantum of the aether's virtual muon we shall know the precise mass-energy of the proton. Our progress so far assures us that it is 8.899 times that of the virtual muon or, as may be shown by the very simple mathematics involved, to be far more precise as 8.898979486 times that quantity.

Note that, the equivalent algebraic formulation for this quantity is:

$$9 - 2[(3/2)^{½} - 1]^2$$

which is the expression used in equation (2.8) in chapter 2.

The Mass-Energy of the Taon

In the effort to understand the myriad of particles that have revealed themselves in high energy experiments by particle physicists, one has sought to build patterns of their relationship and classification. This seems not to be aimed at understanding how these particles are created but rather more directed at spotting gaps in the pattern and looking for evidence that might fill those gaps. All that is a rather futile exercise, bearing in mind that those particles are all so short lived that one wonders whether they are Nature's creation or man-made resonance effects arising from the high energies used in their manufacture.

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Nevertheless, there has to be a natural process by which those gravitons discussed in chapter 2 are created and, given the argument that the activity of the muons in the aether creates the proton, it is logical that we should try to build on that theme in considering graviton creation.

I would expect that, since the creation of protons can mean that matter is being added to the E frame of the aether and this implies the need for gravitons to be created to provide dynamic balance by settling in the G-frame, the creation of protons and gravitons could well occur as if from the same manufacturing process. One needs to imagine that the aether is ever trying to deploy its energy to create protons but failing to keep them alive if the energy surplus to its equilibrium requirements is insufficient. Also, and with equal vigour, it will surely seek to create gravitons as well, given the necessary energy and vacancy in the graviton frame that provides dynamic balance for the quantum jitter of matter, such as those protons that are created amongst the quons in their reference frame.

So proton creation and graviton creation go hand in hand. Note, however, that what you will see emerge from this exercise is the creation of the more prevalent graviton, the taon form already discussed in chapter 2, where it was shown how the taon and the more massive g-graviton form were related. The latter, as we have seen, has a mass that is 1.452627 times that of the taon.

If taons are created with protons, why not just consider the possibility that they can emerge from the very same process as that represented for proton creation in equations (4.4) and (4.5)? All we need to do is to imagine that two proton creation events occur side by side, meaning a proton and an antiproton, so that, in energy terms, the overall equation is:

$$2(P{:}k\mu)_{MIN} + 2z = 2P \quad \text{..... (4.6)}$$

Then suppose that, before the emerging proton-antiproton pair 2P are created, only to decay by mutual annihilation, the two z particles,

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being of opposite charge e, as otherwise they would not come together, merely combine first and so decay to dissipate their energy. That would leave the energy of those two neutral combinations of charge which might find a way of combining with a similar neutral energy entity to then divide as two particles of opposite polarity charge e. If the product were a pair of taons then, by the following equation:

$$4(P{:}k\mu)_{MIN} = \tau^{+} + \tau^{-} \quad \text{..... (4.7)}$$

The mass of each of those taons would be 2(0.9495)P or 1.899(P). Now, since the proton P has the mass-energy 938.3 MeV, this means that the taon has the mass-energy value close to 1.782 GeV. This corresponds with the algebraic formulation of equation (2.9) in chapter 2.

So here we have the taon that assumes the role of a graviton emerging from the very same process that accounts for proton creation. This mass-energy quantum is that found from measurements of the taons that appear transiently in the matter state.

Moreover, there is something we can even add in connection with this process that is a kind of additional check of our analysis. It is the fact that:

$$(P{:}k\mu)_{MIN} = 891 \text{ MeV} \quad \text{..... (4.8)}$$

and that there is a meson in the experimental particle spectrum that is denoted K*(892) to signify that its measured mass-energy is approximately 892 MeV and this meson is the only one intermediate the proton mass-energy of 938.3 MeV and the mass-energy 783 MeV of the $\omega(783)$ meson.

This, therefore, endorses both the above derivation of proton mass and this more direct route of accounting for the taon creation process.

Now, at this stage, it is interesting to explore this subject of taon creation just a little further and ask ourselves what happens if Nature tries to create more massive particles by bombarding the taon with pairs of muons. Well, once the energy involved is high enough

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then it would seem that the onward decay could bring those heavier gravitons into their transient existence. However, other particle forms having a much shorter lifetime will surely be created as well and it is of interest to consider this, as we now see.

Hyperon Creation

Taons are leptons. They decay by mutual annihilation and such decay can be triggered by muons. Consider then their combination with a pair of muons of opposite charge. Might the taon be converted into a charged particle of higher mass-energy? If it were and this new particle, lacking the company of an abundance of similar particle forms, found it was unstable, then how might it stage that decay? Well, since space in the continuum cannot be created by a spontaneous demand, it seems likely that it would share its own charge volume with that of two of its brethren of opposite charge e, so that, by decay of an opposite charge pair, the single charge could take up residence in a space having three times the volume as the original charge form.

This would mean that the particle so formed would have a charge radius larger by the cube root of 3 than the original particle and so smaller in mass-energy in inverse proportion.

What this means is that, if N muon pairs merge their energy with the taon to create a single particle of charge e and energy τ plus $2N\mu$, then three such particles could come together and shed much of their pooled energy in a high energy environment to leave a new residual particle having a mass given by:

$$0.693(\tau + 2N\mu)$$

Note that 0.693 is the inverse of the cube root of 3. With τ as 1.782 GeV and 2μ as 211 MeV this suggests that, depending upon N, a series of particle by-products might be generated in high energy particle experiments, their mass-energies being:

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1.235 GeV for N = 0 : $\Delta(1235)$
1.381 GeV for N = 1 : $\Sigma^*(1385)$
1.527 GeV for N = 2 : $\Xi^*(1530)$
1.674 GeV for N = 3 : $\Omega^-(1675)$

These mass-energy values can be seen to correspond to hyperons that feature in the high energy particle spectrum, as indicated by their standard symbols. The data listings from which these are quoted evidently rounds-off energy values to multiples of 5 MeV, no doubt owing to the approximate nature of the measurements.

It is submitted that on this basis we can be quite confident about the physics underlying the particle creation processes here discussed. The taon is clearly a major player on the aether scene and it is very reassuring to find that its creation stems from activity which also produces the proton.

It is not intended here in this discussion of the physics of creation that we should try to delve into the creation of the many other particles that are found in high energy experiments. All I seek is to give account of the creation of the primary matter particles and the particles hidden but ever at work in its governing agency, the aether. The task, as we have already seen, has taken us into the realm of unified field theory and there is much more to discuss concerning cosmic issues.

This has to be after we have really delved deeper into the mathematics of the aether to show how its structure and form give basis for wave mechanical phenomena and determine the fine-structure constant. The latter is a key factor in any pursuit to understand the foundation for the creation of our universe.

Also much has to be said to reinforce the case for the aether already presented, given the strength of conviction of theoretical physicists on the relativistic front, the group hostile to aether theory with its three-space dimensions, and those of the quantum-electrodynamic front, the group hostile to attempts at deriving the

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dimensionless constants of physics by methods they see as unorthodox.

This effort, which may seem a little tedious, will include the theoretical derivation of the virtual muon mass, thereby allowing full theoretical evaluation of the proton-electron mass ratio, but, for those who have skipped over the latter part of the previous chapter, one can see by referring back that we have not ignored the slightly different mass of the muon in evidence in the matter frame.

Happily, once through the detail of the next three chapters, we shall arrive at the more exciting prospect of seeing how stars are created and the spin-off from that pursuit which brings us down to Earth as we explore the scope for using the knowledge so gained to tap into the energy resource of the aether itself.

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