

On a cosmogonical and still-continuing origin of baryon asymmetry and of vorticity in the Universe.

Miles Osmaston

'Baryon asymmetry' problem. Electron-positron pairs and proton-antiproton pairs often appear in high energy experiments but the antimatter components, positrons and antiprotons, are extremely scarce in the wider environment. Why is this so? Positrons are positive objects. But antiprotons are electrically negative, built up of three quarks. So what part, if any, does this play in the evidently low durability of antimatter?

Summary. By making particles out of aether (i.e. as constructs of aether vortical motion) one assures that wherever the particles are in random motion, so also is the intervening aether, inferred to be a continuum of **negative** electric charge. The differential charge of the electron-positron pair is then achieved if the electron construct incorporates more aether and the positron correspondingly less than the mean. In the case of the electron, its high charge-density character apparently makes the electron's vortical structure possess supreme stability in the face of the random electromagnetic excitation by the aether. Electrically positive vortical structures of aether motion, with their low aether densities, are susceptible to demise as positrons, in the face of that excitation, and others are only rescued from demise by grouping into aether-circuiting threes of vortices (aether-circuiting being the nature of the Strong Nuclear Force) and then being captured by electrons to form hydrogen atoms. This capture turns the object/atom into an electrically neutral one, which further vastly reduces the disruptive effect of aether random motion upon it. Hence is born the most stable atom in the Universe.

Step A. In [1] - also see the next pages here in which I reproduce Slides 7 & 8 of my corresponding presentation at the Vigier VIII memorial conference in August 2012 - I have implemented Maxwell's equations aether as a compressible continuum of negative electric charge, of extremely high mean charge density $>10^{30}\text{C}/\text{cm}^3$. That figure is based on the effective size of electrons and positrons inferred from observations of their collisional mutual scattering in LEP at CERN, communicated to me 1991 and 1996, in handwritten letters, by George E Kalmus, who had lately been its scientific director.

Constructing particles out of aether

Quantifying the aether

The aether can only be of one sort of charge, so how do we get particles with opposite charge?

To provide electrons and positrons with opposite relative charge, we suppose one to contain *more* aether and the other *less*, like this:-

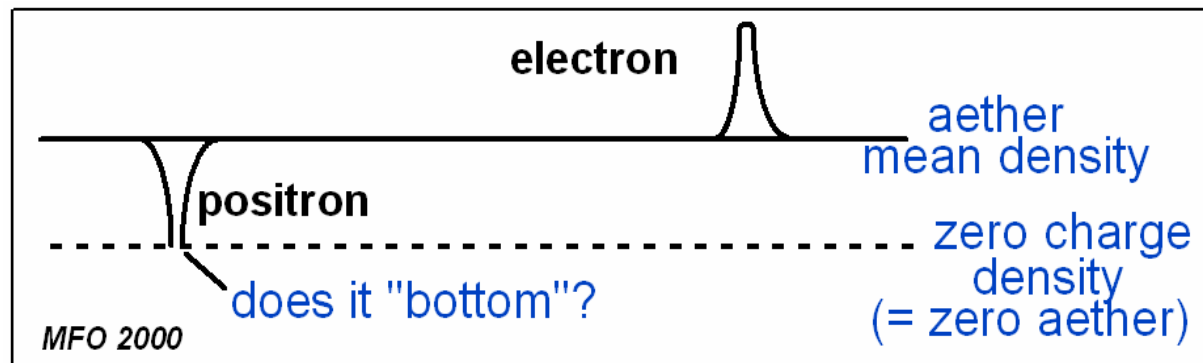


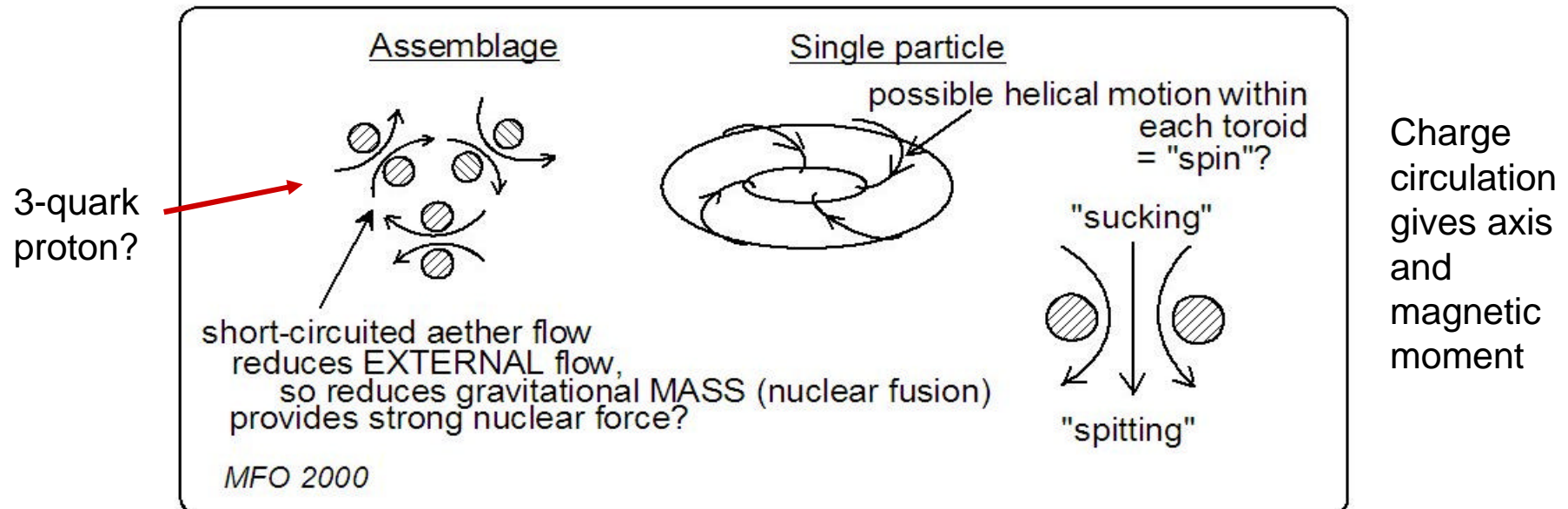
Diagram based on a negative-charge aether

On this basis the mean charge density of the aether must at least equal the peak charge density in a positron. From the scattering-determined sizes (LEP) and its known (relative) charge we find the aether mean charge density must be **at least 10^{30} coulombs/cm³ !!**

This huge charge density gives its self-repulsion an immense force potential if it is locally displaced (gravitation) and may well provide the irrotational reference frame on which our directional devices depend. 7

Taking a look inside a finite-sized fundamental particle made of aether

Mass and mutual gravitation as the result of vortical action



On the right is a cross-section of the central image. The mass of a particle or particle assemblage is measured by its (aether-sucking) ability to attract others.

On the left, two quarks (= mesons) are unstable ($<10^{-7}$ sec) because aether-circuiting is poor (strong nuclear force is insufficient), but three quarks (protons) are stable, although adding an electron (neutrons) causes instability (10 minutes) in a free state, exposed in randomly moving aether.

Mutual attraction predominates statistically over repulsion because of the force gradient. At a given position, infinitesimal convergence has more force-effect than identical separation. That's why we only have

positive-only gravitation – no negative.

Hence I have shown that the ideas of Maxwell and W Thomson (Kelvin), beginning in the 1860s, that fundamental particles are (ring) vortical constructs of its motion, results, as they foresaw, in a rewarding insight into how their mass property is developed within them; and how the gravitational force is developed between assemblages of such particles.

Although my drawing (Slide 8) of such a vortex ring was done in 2000, I have subsequently discovered that it is almost identical with that portrayed by Thomson in TRSE 1967 [4]. My only embellishment is that the aether motion is helical around the torus, to provide circulation of aether electric charge and hence the magnetic moment of the particle, a particle property not then known to physicists.

Thus constructed, to provide their opposite polarities, electron ‘cores’ contain more (twice?) than the mean aether charge density and positrons correspondingly less (maybe near-zero at their minimum-density point in their dynamical cores).

Step B. By ‘making particles out of aether’ we achieve two far-reaching results.

(i) Aether and Matter are not dynamically independent, so the Michelson-Morley result is validated without abandoning the aether [2].

(ii) In [2, 3] I point out that therefore the aether (charge) is in a random motion that is a highly averaged representative of the particle motions within it. This constitutes a random electromagnetic excitation of any existing particle structures. Because of the all-pervasive nature of the aether, that excitation is not excluded from solid structures, even pervading the interiors of atoms, where the lifetimes of nuclei, otherwise commonly attributed to functions of the Weak Force/boson, may reflect the degree of screening provided by the electron shells. The presence of this random excitation appears to offer the basis for the stochastic aspect of quantum electrodynamics [3].

Further, the presence of this random excitation offers an explanation of the photo-electric effect without resort to the propagation of light as discontinuous quantized packages (photons). It is only necessary for the illuminating wave energy, added to a local momentary peak in the random excitation of an atom, to raise it to the level of electron release. So the release of an electron no longer signifies that an entire quantum of energy has arrived at that point. Because

that excitation is of a balanced random nature it may either assist or deter the release of an electron, so the **mean rate** of electron release corresponds directly to the illumination energy, i.e. is the **same as if the random excitation were absent**, but that concentrated photons were involved. This is a classic case in which averaging, beloved by physicists as a means of improving accuracy, has ‘thrown out the baby with the bathwater’ by obscuring the underlying essential physics.

Step C. Ampère’s Law, embodied in Maxwell’s equations, provides that linear relative motions of charge (as a feature of this aether random motion) will provide coupling in shear and the introduction of vorticity. So, at a cosmogonical level, this random motion will be able, among a plethora of forms, to generate/create electron-like and positron-like vortices. But the low charge density inside positrons will make them far more susceptible than electrons to being disrupted by the random aether excitation. Hence their observed low survival rate (baryon asymmetry) when electron-positron pairs have been **created** in high energy experiments, although the observed abundance of such pairs in these circumstances is commonly regarded as ‘finding’, not as ‘creation’.

Step D. But what about the proton-antiproton asymmetry? To make a positive proton out of negative aether it should, like the positron, consist of LESS aether than the mean; so why has it survived so abundantly? For the answer we must go ‘back’ to cosmogony of complete atoms within and from a randomly moving aether. In [3] I argue that this process is ongoing in today’s Universe, wherever the right conditions are present.

Protons, with 3 quarks, are complex affairs, but electrons, and their (ring) vortical structure, are of the simplest conceivable character that would be able to develop a mass property. So in a randomly moving aether the probability of generating/creating an electron-type ring vortex will be the highest, and we have seen (Step C) why their positron counterparts may not survive the random electromagnetic disturbance for long.

In parenthesis, I would add that in [3] I saw neutrinos as pure eddies of aether motion, without the mass-giving vortical, or *aether-sucking*, component. Nevertheless that eddy motion is a form of energy [3], so neutrinos have energy but no mass.

I see the cosmogony of the Universe as an exercise in ‘the survival of the fittest’. An electron, once created, will, on account of its charge concentration, still be subject to random displacement by the random motions of the aether in which it is entrained. But if the occasion were to arise that could neutralise that charge, the perturbing force upon it would drop dramatically (by some 36 orders) to the level associated with its gravitational aether-sucking, and the longevity of the result still further improved. To do this it needs to find/capture one or more positively-charged vortical constructs (quark-like), or assemblages of them, enough precisely to balance its own negative charge.

[But the quarks in a proton are supposed in Standard Theory to consist of two Up Quarks with $+2/3$ unit (electron-sized) charge and one Down Quark with $-1/3$ unit charge, the result being $+1$ electron-sized charge for the proton. I suspect that the simplicity of this scheme of fractional division is partly because the electron charge is treated as the ideally indivisible unit charge. In CT the aether is seen as an infinitely divisible continuum of charge. Nevertheless we will proceed on the basis that the proton has two positive and one negative quark.]

Meanwhile, from among the plethora of quark-like vortices present in a randomly moving aether, the positive ones being low in viability on account of their low aether density content, some will have much improved their durability by clinging together in threes, so that some of their aether pumping is circuited around the triangle, to be seen subsequently as the Strong Nuclear Force [1] - see page 3 here. The more the aether flow that can be circuited, the more effectively will they cling together.

But the proton’s mass is its external property, measured in CT by the **externally** acting aether flow/sucking, i.e. by the amount of pumping mismatch, or flow leakage, from our triangle. Electrons and positrons have similar masses/pumping but have equal and opposite charge. If quarks are like that we may surmise that the Up quark vortex, with its higher charge, pumps twice as much aether as that of the Down quark, and the total flow mismatch around the triangle will equate to that of one Up quark. So we have the perhaps surprising result that the entire mass of the proton is in effect provided by just half of the total pumping provided by its two Up quarks. In other words, the mass or pumping capability of the Up quark is equal to that of the whole proton, which we know is 1836 times that of an electron. So quarks are much heftier vortices than electrons. [In Standard Theory the vast majority of the

proton's mass is attributed, relativistically ($E = mc^2$), to the (undefined) internal motion energy of the quarks.]

In a random aether motion system huge numbers of such triplets will have formed, but of widely various total positive charge. From among these the electrons will 'pick out' for stable capture only those, which we now call protons, with exactly the right balancing charge. And so, at last, was the highly stable hydrogen atom born, from which the Universe has been evolving, and still is. The continuing abundance of this neutral hydrogen (seen as 21cm HI radiation) is the motive for building the SKA (Square Kilometer Array) across the continents of the southern hemisphere. And LOFAR (Low Frequency Array) is being built to look for it at high redshifts. In this light I do not accept the belief that the Universe is now mostly ionized, so the 'epoch of reionization' built into BigBang theory is/will be called in question by the increasingly apparent presence of all this neutral hydrogen.

* * * * *

[1] **Osmaston M. F.** (2013) Implementing Maxwell's aether illuminates the physics of gravitation: the gravity-electric (G-E) field, evident at every scale, from the ionosphere to spiral galaxies and a neutron star extreme. In *The physics of reality: space, time, matter, cosmos.* (ed. R. L. Amoroso, L. H. Kauffman, and P. R. Rowlands), pp. 388-410. Singapore, World Scientific Publishers, ISBN: 978-981-4504-77-5.

[2] **Osmaston M. F.** (2003) A particle-tied aether - Indications of a deeper foundation for physics and relativity. *Physical Interpretations of Relativity Theory (PIRT) VII, British Society for the Philosophy of Science, 15-18 Sept 2000 Late Papers (M.C. Duffy, ed), PD Publications, Liverpool (ISBN 1 873 694 05 9), 230-240.* Now to be found at http://www.space-lab.ru/files/pages/PIRT_VII-XII/pages/text/PIRT_VIII/Osmaston_4.pdf.

[3] **Osmaston M. F.** (2013) Continuum Theory (CT): its particle-tied aether yields a continuous auto-creation, non-expanding cosmology and new light on galaxy evolution and clusters. In *The Physics of Reality: Space, Time, Matter, Cosmos* (ed. R. L. Amoroso, L. H. Kauffman, and P. Rowlands), pp. 411-433. Singapore, World Scientific Publishers. ISBN: 978-981-4504-77-5.

[4] **Thomson W.** (1867) On Vortex Atoms. *Proceedings of the Royal Society of Edinburgh, VI*, 94-105, Reprinted in *Phil. Mag.* Vol. XXXIV, 1867, pp. 15-24.

First completed 20 July 2013.....Word count (minus refs) 1018.....MFO

Revised, Slides 7 & 8 inserted as pdf, 03 Aug 2013...Word count 1143... MFO

Minor text additions, 18 Nov 2013.....Word count 1297.... MFO

Changes to p.1 and minor additions 31Dec 2013Word count 1679.... MFO

Changes to quark reasoning 9 March 2014 Word count 1732.....MFO