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Appendix H

Quarks, the strong nuclear force and energies of nuclear fusion.

The toroid picture of the aether motion pattern that may represent particles of non-zero mass (see section 5 and Appendix D) provides a possible explanation of why there have to be 3 quarks in a proton.

I suggest that the force which holds the quarks together, the Strong Nuclear Force, arises from a mutual short-circuiting of the aether pumped through the quarks.

It is clear that 2 quarks, placed side-by-side but "opposite ways up" (one pumping aether upwards, the other pumping downwards) could result in a small part of the pumped flow simply circuiting through the 2 quarks. Mesons, which contain 2, are highly unstable, with free-space lifetimes less than 10^{-7}s. Obviously, however, a triangle of 3 quarks, with their pumping directions pointing in the same direction around the triangle thus :-

possible helical motion within each toroid = "spin"?

short-circuited aether flow
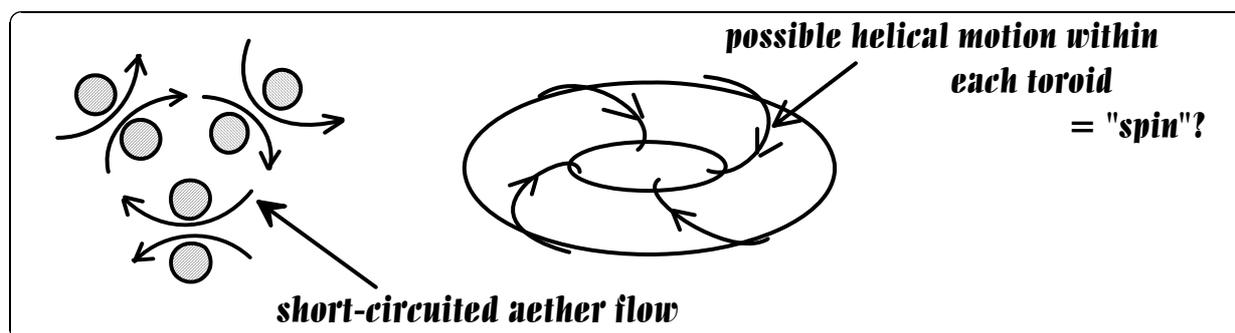
will involve far tighter coupling of the flows than is possible with only 2 quarks. To put it another way, three is the minimum number needed to make a ring in which a significant part of the total aether flow through each quark is confined to the circuit through them all.

I propose that it is this circuiting of the aether flow which binds the quarks together.

The same argument can be extended to complex nuclei in general. The Strong Nuclear Force is thus attributable to the mutual circuiting of a proportion of the aether flows generated by the constituent particles.

Now a nucleus thus constructed and bound together will consequently have less aether flow available externally to provide gravitational effects. This is another way of saying the gravitational mass of such a nucleus will be less than the sum of the gravitational masses (when individually in a free state) of its constituent particles.

The mass loss (treated as energy output) upon nuclear fusion for all nuclear species up to atomic number 57 is accepted by everyone as the basis for stellar energy output during their evolution. The model provides a physical picture of how that mass loss occurs.

It is not immediately obvious from the model, however, why that mass loss should appear as energy. The energy of aether motion, corresponding to the mass loss, is (in the model) not lost to the external world but confined within the nucleus. This will need to be sorted out.

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