Improvement of the Accuracy of HCE8S Theory Thanks to the Z(4430) Tetraquark

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Abstract: Due to a mistake on the HCE8S flow diagram the accuracy of the neutron mass was less than it should have been. Correction of this error leads to both $u_n$ and $d_n$ mass changes for neutronic quarks.

In preparing my last flow diagram\(^1\) for HCE8S theory, I made a mistake at the top of the second page. It should read $Z(4430)/(1.0221480)^2 = 4430/1.0447865 = 4240.1007/15.5$ tau neutrino= 273.55488. Taking 3.55488 as the mass of the $d_n$ quark and $0.00488 \times 2 = 0.00976$ subtracted from 2.3 (mass of the $u_p$ quark), one also gets 2.29024 for the mass of the $u_n$ quark. For $2d_n$ we have $7.10976$, and the mass of the neutron is 939.9946. For $u_n/d_n$ we have $2.29024/3.55488 = 0.64425$ million years (not much different than before) and for $940/939.9946 = 1.0000057$. This is almost the same number we got for protons ($1.0000055$) rather than $1.0004625$ found before (see my last note).

Note that TF was active when the neutron came into existence (E8 symmetry was broken), so 4-digit mass simplification cannot be used for $u_n,d_n$ quarks as it can for the other quarks. As for protons, their 6-digit values seem to be needed indicating they formed at or later than the big bang but not later than re-ionization (at which time the charged protons must have existed).

We see a trend here; broken E8 symmetry when the entity formed means that 6-digit mass values are needed, unbroken symmetry indicates 4-digit values (or less) suffice.