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The electron and its symmetry in empirical approach to the standard model development

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Unexpectedly accurate relations between nucleon masses and the electron rest mass as well as the role of QCD-based gluon-quark-dressing effect are considered in this review. In the standard model, particle masses are empirical parameters. However, different authors including Y Nambu and R Feynman turned attention to certain particle mass relations which are used in this work:

1) Pion's mass splitting δmπ=4594keV is close to 9me=4599keV. Hence the doubled value of pion's ß-decay energy is close to δ=16me.

2) Empirical relations found by Y Nambu and A Hautot mN=mμ+6mπ and mπ/mμ = 17/13, allow introducing the period of (mπ+mμ)/(17+13)=8174keV, close to δ=8176keV. Masses mμ, mπ, and mN are close to nδ (with n=13,17,115 where n is a number of the period δ). Pion's parameters fπ =130.7MeV and ΔmΔ=147MeV=(mΔ-mN)/2 correspond to n=16 and 18.

From CODATA evaluation one can find that the shift of the neutron mass value relative to 115δ - I am equal to δmn=161.56(6) keV which accounts an integer ratio with nucleon mass splitting δmN=1293keV: δmN/δmn=8•(1.0001(1)). It was considered as a presence of fine structure with the period 161keV=δmn=δmN/8. Discreteness with CODATA parameter δ=16me extended up to the higher energies. Lepton ratio L=mμ/me=207 was found between vector boson masses MZ, MW, and constituent quark masses Mq, M'q. Long-range correlation with δ was noticed between the scalar mass and the top-quark mass as well. Mass grouping effect at 58GeV observed in the L-3 experiment by S. Ting and coworkers as well as a remark by F. Wilczek about the distinguished position of the top-quark in the particle mass spectrum will be discussed.

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