Supplementary information

In my consideration, I used confining potential in the form σ4π*R*2. However, the physical reason for the origin of such confining potential was not clear earlier. A model is offered in my article [1], explaining the origin of this potential and holding pressure due to the effect of impulse recoil of the special emitted virtual bosons, supposing bosons of Higgs.

So then for the ground of this model, we entered the next suppositions [1]:

1. Every elementary particle radiates the special virtual bosons as spherical waves

*A*( ei*kr*/*r*) e-iωt . Here *k* -is a wave number of virtual boson, ω –its angular frequency, *r* is the distance from the center of a particle(*r* >*R*), *A* is a normalizing constant.

2. We suppose that complete amount of the bosons emitted by a particle in a unit of time *N*H is proportional to area of the particle surface with a coefficient γ, characterizing the intensity of radiation for a certain group of particles: *N*H = γ4π*R2.*

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As every moving wave carries an impulse, it ensues from these suppositions, that on the surface of elementary particles because of the effect of impulse recoil, spherical waves create a holding force of pressure *F*(*R*) and confining.potential.*Ф*(*R*).=∫*F*(*R*)d*R .* It follows from these suppositions that an elementary particle creates its confining potential [1], which can have the form *Ф*(*R*)=const×*R* 2.

Decay schemes for μ and π

μ-→ e- + ν̃e + νµ μ+→e+ + νe + ν̃µ 98.6% π- → μ-+ ν̃µ → e- + ν̃e + νµ + ν̃µ

π+ → μ++ νµ → e+ + νe + νµ + ν̃µ

99.97%

The energy constant σ was determined earlier in [2] using the neutral pion mass *m*o = 134.963 MeV / c2 based on the initial model assumption that the muon, pion, and kaon elementary particles in the stopped state can be represented as resonators for quanta of virtual neutrinos excited inside the lepton shell with confining potential

*W*s = σ4π*R*2 :

σ =4x3-7π-3(*m*oc2)3/(ћc)2 ( =3.724x1023 Mev/cm2 )

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Neutrino νe is considered in the model as an electron without electric charge, that is as an elastic lepton shell contracted to a minimal size.

The number of the virtual neutrino quanta was determined from the decay scheme: *N* = 2 for muon, 3—for pion, and 21—for kaon.

Equations for virtual rest energy of elementary particles νℓ , e, μ, πo, π± , Ko, K± , ℓ = e , μ ,τ [ 1-2 ]

1. *E* = σ4π*r*2 + δ(νℓ )e2/*r* for νе, νμ and ντ
2. *E*= σ4πρ2 + e2/2ρ for electron
3. *E*= σ4π*R*2 +1.5×2ħπc/(*R*- ρ)+ e2/2ρ for µ
4. *E*= σ4π*R*2 +1.5×3ħπc/*R* for πo
5. *E*= σ4π*R*2 +1.5×3ħπc/(*R*- ρ)+ e2/2ρ for π±
6. *E*= σ4π*R*2 +1.5×21ħπc/*R* for Ko
7. *E*= σ4π*R*2 +1.5×21ħπc/(*R*- ρ)+ e2/2ρ for K±

In equations (3-7), the quantities 1.5ħπc/*R* and 1.5ħπc/(*R*- ρ) are the energy of one virtual quantum of the neutrino in a resonator with a virtual radius R, taking into account the energy of the zero-point oscillation.

The masses of particles and characteristic sizes *rm, Rm,* and ρm are determined at minimization of virtual rest-energy *E* on *r*, *R,* and ρ from equations:

∂*E*/∂*r* =0, ∂*E*/∂*R*=0, ∂*E*/∂ρ=0 , and *M*i c2= *E*min .

Calculated values of the masses of e, μ, π0, and K0 are in relation:

0.547: 105.707: 134.963: 493.87 (MeV/c2)

(by attachment to the mass of neutral pion), that is in accord with experience data:

0.511: 105.66: 134.963: 497.648 (Mev/c2).

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Formulas for masses e, μ, πo, π±  ,K0, K± , νе, νμ and ντ

*m*e=3(πσ/4)1/3e4/3/c2 = 0.547 Mev/c2

*m*(μ) = 3πσ1/3(3ћc)2/3[1 + β/ (6π)1/2 ]4/3 /c2 =105.707 , β=(1/137)1/2

*m*(π0) = 3πσ1/3(4.5ћс)2/3/c2 to equate 134.963

*m*(π±) =3πσ1/3(4.5ћc)2/3 [1 + β/(3π)1/2 ]4/3/c2, = 137.862

*m*(K0) = 3πσ1/3 (21x1.5ћс)2/3 /c2 = 493.87

*m*(K±)=3πσ1/3(21x1.5ћс)2/3 [1 + β/(63π)1/2]4/3 /c2 = 497.87

σ=4x3-7 π -3(*m*oc2)3/(ћc)2 (=3.724x1023 Mev/cm2 ) // m(π0)/ m(μ) ≈(3/2)2/3

*m*( νℓ ) = 3-5 21/2 π-4 *F* [(5/3) Lnα + (8/3) Ln (*M*w / *m*ℓ ) + η] *m*0 (9A)

*m*( νℓ ) = 3-5 21/2 π-4 *F* [ (8/3) Ln (*M*w / *m*ℓ ) + 2 ] *m*0 (9B)

where *F* = GF (*m*0c2)2 / (ħc)3 = 2.116 x 10-7 ,*m*o= *m*(π0) =134.963 Mev/c2 , α ≈ 1/137

*m*(νe)c2 ≈ 4.3 x 10-2eV, *m*(νμ)c2 ≈1.9 x 10-2eV, *m*(ντ )c2 ≈ 6 x 10-3eV (7A)

*m*(νe)c2 ≈ 5.7 x 10-2eV, *m*(νμ)c2 ≈ 3.3 x 10-2eV, *m*(ντ )c2  ≈ 2 x 10-2eV (7B).