MASS FORMULAE for PARTICLES

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Abstract

May we say?, the distribution of all particle masses are "Random" or "Chaos" or "Fractal" or "Bushing" as a whole. We can say perfectly, it is "Bushing". It's looks like a relationship among the masses of galaxy, sun, earth, moon, lunar orbiter. And also like the structure of contents(section, paragraph, item) in books. Generally, mass structures have the power of it's interaction constants. I state a fundamental formulae about particle masses in this purview.

1. Introduction

Now, this doctrine become one of dramatic progress in 21th century particle physics. First, I show the 3 basic constant together at first as the knowledge of new liberal science. The gate of particle's mass enigma is opened by the divine wisdom in this immortal treatise.

$c = 2.99792 \times 10^{8}$ M/S	Light velocity [1].
$h = 6.62607 \times 10^{-34}$ J·S	Plank's constant [1].
$m = 35.233$ MeV/c^2	Turu mass unit.

2. Charged Lepton Mass Formulae

We can represent the charged lepton mass, in the power form of α^n, by using of the coupling constant, namely $\alpha = \alpha_E = (137.035989)^{-1}$ [1]. In this case, "n" is generation number and also integer(1, 0, −1). then it needs coefficients of their term and fundamental mass unit "m" above indicating. I cast lepton mass formulae in the below.

$$M(e^{\pm}) = 2\alpha^{1}m$$
$$M(\mu^{\pm}) = 3\alpha^{0}m$$
$$M(\tau^{\pm}) = e^{-1}\alpha^{-1}m \qquad \text{here: } e = 2.71828...$$

3. Divine Index of Charged Lepton

The value of Ln (Mass /Turu mass unit), is one kind of mass entropy. We respect their value as using of a term word "Divine Index." Here, I mention the

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divine index table of charged leptons.

$$\begin{aligned}&\mathrm{DIV}(\mathrm{e}^{\pm}) = \mathrm{Ln}2 + \mathrm{Ln}\alpha\\&\mathrm{DIV}(\mu^{\pm}) = \mathrm{Ln}3\\&\mathrm{DIV}(\tau^{\pm}) = -1 - \mathrm{Ln}\alpha\end{aligned}$$

Furthermore, there are radian representation form of divine index. For example,

$$\mathrm{DIV}(\mathrm{e}^{\pm}) = -4\pi/3, \quad \mathrm{DIV}(\mu^{\pm}) = \pi/3$$

This data come from the analytical continuity of QED conclusion about electron mass.

4. Meson Mass Formulae

Mathematically, n-mod method is effective for hadron(meson,baryon) mass analyzing. I offer meson mass formulae only the conclusion of this analysis. 4 kind of π^0 meson mass formulas are set at below.

$\mathrm{M}(\pi^0) = \{(2^2+1)(2^2-1) - 3^{-1}\}^{1/2}\ \mathrm{m}$	normal form.
$\mathrm{M}(\pi^0) = \{(2^2-3^{-1})^{1/2} + (2^2-3^{-1})^{1/2}\}\mathrm{m}$	parametric form
$\mathrm{M}(\pi^0) = (2^3+2^2+2^1+2^0-3^{-1})^{1/2}\ \mathrm{m}$	2^{n} power form.
$\mathrm{M}(\pi^0) = (5+4+3+2+1-3^{-1})^{1/2}\ \mathrm{m}$	integer form

$\pi^{\pm}$, η meson mass formula.

$$\begin{aligned}&\mathrm{M}\ (\pi^{\pm}) = (2^4-3^{-1})^{1/2}\mathrm{m}\\&\mathrm{M}(\eta) = (3^5-3^{-1})^{1/2}\mathrm{m}\end{aligned}$$

5. Central Meson Mass Formulae

$\mathrm{Ds}^{\pm}$ is only one central meson on the quark scheme, and this form make massive moment to our recognizing for meson mass structure. $\mathrm{Ds}^{\pm}$ mass, strange & charming formulae.

$$\mathrm{M}(\mathrm{Ds}^{\pm}) = (5^5-3^{-1})^{1/2}\mathrm{m}$$

We have a great admiration for this consequence of "fifth power of 5" symmetry.

6. Baryon Mass Formulae

Also , the conclusion of fundamental baryon mass formulae are,

$$\begin{aligned}&\mathrm{M}(\mathrm{P}) = (3^3-3^{-1}-5\alpha-4\alpha^2)\mathrm{m}\\&\mathrm{M}(\mathrm{N}) = (3^3-3^{-1})\mathrm{m}\\&\mathrm{M}(\Lambda) = (2^5-3^{-1})\mathrm{m}\\&\mathrm{M}(\Omega^-) = (3/2)(2^5-3^{-1})\mathrm{m}\end{aligned}$$

7. Turu Level and Super Mass

From above their mass formulae, we can easy to find out the below facts. Hadron have always accompany the shadow(negative mass part). This is, the existence of $M_B{}^2 = M_F = -3^{-1}$ mass level, and is called "Turu level." Therefor, we can say, all strong interacting particle always stand on the Turu level. The mass based on the Turu level, is called "super mass," has no physical dimension. For example, the super mass of fundamental particle is disclosed.

$$\begin{aligned} &SM(\pi^{\pm}) = 2^4 \\ &SM(\eta) = 3^5 \\ &SM(D_S{}^{\pm}) = 5^5 \\ &SM(N) = 3^3 \\ &SM(\Lambda) = 2^5 \end{aligned}$$

And then, new idea appear, that is called "super divine index". There are, for example,

$$\begin{aligned} &SDIV(\pi^{\pm}) = 4Ln2 \\ &SDIV(\eta) = 5Ln3 \\ &SDIV(\eta') = 6Ln3 \\ &SDIV(D_S{}^{\pm}) = 5Ln5 \\ &SDIV(N) = 3Ln3 \\ &SDIV(\Lambda) = 5Ln2 \end{aligned}$$

8. Weak Boson Mass Formulae

Electro-weak interaction constant is derived from the below equation.

$$\begin{aligned} \alpha_W &= G_F m^2 c^4 \qquad \text{here: } G_F \text{ Fermi constant.} \\ &= 1.44791 \times 10^{-8} \end{aligned}$$

And, $M(W^{\pm})c^2 = (4\pi G_F)^{-1/2}$
Formally, Weak boson mass formulae are subscribed as the below form.

$$\begin{aligned} &M(W^{\pm}) = (4\pi)^{-1/2}{\alpha_W}^{-1/2}\ m \\ &M(Z^0\ ) = (4\pi)^{-1/2}{\alpha_Z}^{-1/2}\ m \qquad * \text{ generation number} = -0.5 \end{aligned}$$

And then, the value of each interaction constant is fixed by measured mass.

$$\begin{aligned} \alpha_W &= 1.53084 \quad \times 10^{-8} \\ \alpha_Z &= 1.18801 \quad \times 10^{-8} \end{aligned}$$

The difference between α_W(data from G_F) and α_W(data from measured mass) is 5.4%. The great significant rule, the sub-golden section of weak boson mass is a excellent deal.

$$M^4(\gamma) : M^4(W^{\pm}) : M^4(Z^0) = 0 : 3 : 5$$

9. Plank Mass Formulae

$$\begin{aligned} \alpha_G &= G_N m^2/2hc \qquad \text{here: } G_N \text{ Newton's constant.} \\ &= 6.62559 \times 10^{-43} \end{aligned}$$

Then, Plank mass formulae is represented in the below form.

$$\begin{aligned} M(\text{Plank}) &= (4\pi)^{-1/2} {\alpha_G}^{-1/2}\ m \quad * \text{ generation number} = -0.5 \\ &= 21.7671\ \mu\ g \end{aligned}$$

10. The Table of Interaction Constant Value

$$\begin{aligned} \alpha_E &= e^2/2hc = 7.29735 \quad \times 10^{-3} \\ \alpha_W &= w^2/2hc = 1.53084 \quad \times 10^{-8} \\ \alpha_Z &= z^2/2hc = 1.18801 \quad \times 10^{-8} \\ \alpha_G &= g^2/2hc = 6.62559 \quad \times 10^{-43} \quad \text{here: } g = {G_N}^{1/2} m \end{aligned}$$

Furthermore, there are solemn relationships among them.

$$\begin{aligned} &{\alpha_W}^2 : {\alpha_Z}^2 = 5 : 3 \\ &DDD(\alpha_G/\alpha_E) = Ln(\alpha_G)/Ln(\alpha_E) = 2\pi^2 \end{aligned}$$

11. Turu Transformation

Quarks are (C = +1 and C = −1) mixed state by Turu transformation. Example of π^- particle.

$$\begin{aligned} \underline{u} &= (2/3)^{1/2}\ \mu^- \exp(i\pi/2) + (1/3)^{1/2} \underline{\nu_\mu} \\ d &= (1/3)^{1/2}\ \mu^- \exp(i\pi/2) - (2/3)^{1/2} \underline{\nu_\mu} \quad \text{here: } \underline{u}, \underline{\nu} \text{ anti-particle.} \end{aligned}$$

Then, the concept of (particle or anti-particle) is different by the each interaction. P,N,etc(made by 3 quarks) are particle (C = 1) on the strong interaction, but anti-particle (C = −1) on the electro-weak interaction. And, on the gravitational interaction, there is no C distinction except Turu level.

12. The Divine Domain About Numeric Figures

	$G_N = 6.67259$	$\times 10^{-11}$	$M^3Kg^{-1}S^{-2}$	Newton's constant.
	$h = 6.62607$	$\times 10^{-34}$	J·S	Plank's constant.
	$\alpha_G = 6.62559$	$\times 10^{-43}$		Turu's constant.
Withal,	${\alpha_G}^{-1} \cdot h = 1.0000724$		$GJ \cdot S$	G-h parameter.

13. Reference

1. Particle Data Group; Review of Particle Physics.