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The End of Yukawa Meson Theory of Nuclear Forces*

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Yukawa meson theory of nuclear force originates from the fiction of Yukawa potential function which distorts mathematics. Its logical essence is to dismember the physical equation to fabricate a potential function, endow the mass factor in the fictional potential function with the meaning of meson mass, and then claim that the nucleon in the nucleus depends on the meson to exchange force, so there is a meson theory of nuclear force. However, there has never been a meson in the nucleus. It is obviously unreasonable to say that the interaction between nucleons is dominated by other substances that are not in the nucleus. Here I have reviewed Yukawa's paper on the creation of the nuclear meson theory in detail, and strictly pointed out that the serious distortion of the basic mathematical algorithm in the process of fabricating Yukawa potential function is irreparable, and there is no scientific logic and experimental basis to prove that the mass factor in Yukawa potential function is a meson. Specifically: 1) The Yukawa meson theory introduces a delta function without causality into the operator equation of relativistic momentum energy relationship, thus very covertly deleting the energy term, which essentially belongs to tearing and dismembering the operator equation corresponding to the relativistic momentum energy relationship, seriously distorting the basic mathematical algorithms and physical logic; 2) Yukawa's paper tore and dismembered the relativistic momentum energy operator equation to give a mutilated equation that meets the expectation but has no physical significance in practice, and then introduced the unrelated Compton wavelength to knead, interpreted the mass factor in the exponential factor of the exact solution of the defective equation as the mass of mesons that do not exist in the atomic nucleus, and declared that mesons are the medium of nucleon interaction, the nuclear meson theory thus created is anti-scientific logic; 3) The stationary solution of the operator equation of the momentum energy relationship of free particles is Bessel function, but the Yukawa meson theory deletes the energy operator in the operator equation of the momentum energy relationship and then solves the mutilated equation, which is equivalent to strongly twisting Bessel function into an exponential function that meets the expectation, which is a severe distortion of the basic mathematical algorithm; 4) The calculation results of the binding energy of the atomic nucleus show that the nucleus cannot absorb other particles such as mesons when nucleons combine into the atomic nucleus, while Yukawa's meson theory insists that mesons are the medium of interaction between nucleons, which is just the hegemonic fallacy. All these facts mean that the Yukawa meson theory, which is based on distorting the basic mathematical algorithms and fabricating potential functions, is a pseudo-scientific theory and must be completely terminated.

Keywords: Relativistic momentum energy relation; Relativistic operator equation; Bessel function; Yukawa function; Unitary principle; Nuclear force meson theory

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1 Introduction

The law of interaction between substances is the most basic physical law. The discovery of physical laws comes from the analysis of repeatable and highly accurate experimental data. The discovery of the law of universal gravitation is not strict, which is an exception, but the determination of the constant of universal gravitation[1, 2] makes up for this defect. Human cognitive ability to natural laws is not unlimited, but subject to the cognitive scope. To study the law of interaction between ultra-fine and ultra far substances outside the cognitive scope, we rely more on speculation, and then test the extent to which this speculation conforms to expectations rather than truth through experiments.

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*The core argument of this article is that Yukawa constructed a wrong differential equation through a lie distorted by mathematics. By solving this wrong differential equation, a pseudo nuclear potential energy later called Yukawa potential function was obtained, and the mass parameter in the pseudo nuclear potential energy function was forcibly said to be the mass of meson. In fact, this belongs to a brainwashing rather than scientific demonstration, although mesons exist in nature. Yukawa's paper had a lot of wrong physical concepts and mathematical expressions, but it was later packaged as a nuclear meson theory.

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Experimental instruments are made of substances composed of atoms rather than nuclei. Instruments cannot go deep into the scope of nuclei. Therefore, our understanding of atomic nuclei depends more on assumptions, guesses and reasoning. In 1935, Yukawa went beyond the logic of mathematical physics to make a special treatment on the operator equation of the relationship between relativistic momentum and energy[3], obtained a function containing natural exponential factor, which was later called Yukawa potential function[4], asserted that mesons were the medium of nucleon interaction, and thus put forward the nuclear force meson theory[5-9] that has not been tested by logic. However, it is well known that there is no meson in the atomic nucleus. It is illogical to say that mesons are the interaction medium between nucleons. In the past 100 years, there has been a strange phenomenon in physics, which can shake the hearts of the public as long as it is claimed that experiments or theories have made new and incredible achievements due to the theory of relativity. The meson theory of nuclear force was popular soon after its birth. However, what is the truth? Newton's law of motion[10] is the greatest founding law of physics and cannot be surpassed. Because of this, later physicists gave up scientific argumentation and opened a new path, trying to surpass Newton's theory by establishing theories through assumptions. However, whether the assumptions of physics are correct or not has a causal law. Relativity[11] originated from the assumption that the speed of light is constant. We have strictly proved that the assumption that the speed of light is constant is not tenable[12]. It is only an imaginary mathematical inference with incomplete thinking. It is a misunderstanding to think that relativity and quantum mechanics surpass Newtonian mechanics.

In the early days of the theory of relativity, this abnormal logic that goes beyond the mathematical and physical conventions but caters to the curiosity of readers was questioned. However, because the scope of people's query is limited to some conclusions of relativity and fails to go deep into the level of principle, the query lacks strict scientific demonstration, and because the relativists who have become the authority argue that every abnormal inference is a real new discovery. Those who doubted became the losers, and the doubt could not continue. Since then, the experimental reports that developed the theory of relativity and claimed to confirm the relativistic inference, without exception, can cause a sensation and quickly gain the recognition and praise of authoritative organizations, but the authoritative organizations never test its authenticity. As a result, these theories and experimental reports have become the most dazzling content in textbooks, and generations of physicists with firm beliefs have been emerging. The cycle of life and death, be raging like a storm. Relativity will have a long period of vitality. Academic circles excessively advocate the celebrity effect, and modern physics always despises the logical test, leading to hegemonism, which seriously hinders the development of physical theory in the right direction. If we prove that the relativistic energy equation is not tenable within the framework of relativity, will physics be able to start a new development? This problem makes us have a clear understanding of the meson theory of nuclear forces which ostensibly relies on relativity, but this is not the focus of this paper.

There is no meson in the atomic nucleus. Isn't Yukawa's nuclear force meson theory indisputably and directly denied? It can be proved that even if there are mesons in the atomic nucleus, the experimental test of meson theory of nuclear forces also constitutes a logical loop of dead cycle[13]. The physical debate completely confined to the principles of modern physics will never come to an end, and will eventually end in the strange circle of Anti Science in which truth is always strangled by the arbitrariness of authority. So is there a new basic principle of physics equivalent to mathematical axioms that will make it easy for future physicists to find the key to wrong logic, so that they will not waste time and energy identifying the experimental data that have been tampered with under the pretext of systematic error correction and the so-called major experimental observation data that have even been fabricated through analog signal scaling?

Here, let us jointly reveal various principled errors in Yukawa's meson theory of nuclear forces, appreciate the powerful logical power of the unitary principle originally proposed in 1985 and continuously improved in its application, and then completely terminate Yukawa meson theory of nuclear forces in many aspects within the logical framework of relativity.

2 Introduction to Yukawa meson theory of nuclear forces

Fermi treated the problem of β-disintegration on the hypothesis of "neutrino". According to this theory, the neutron and the proton can interact by emitting and absorbing a pair of neutrino and electron. But the interaction energy calculated on such assumption is much too small to account for the binding energy of neutrons and protons in the nucleus.

Yukawa believes that it seems natural to modify the theory of Heisenberg and Fermi in the following way. The transition of a heavy particle from neutron state to proton state is not always accompanied by the emission of light particles, i.e., a neutrino and an electron, but the energy liberated by the transition is taken up sometimes by another heavy particle, which in turn will be transformed from proton state into neutron state. If the probability of occurrence of the latter process is much larger than that of the former, the interaction between the neutron and the proton will be much larger than

in the case of Fermi, whereas the probability of emission of light particles is not affected essentially. The interaction between elementary particles is usually described by a force field, just as the interaction between charged particles can be described by an electromagnetic field. Yukawa cites the term of quantum mechanics that was just emerging at that time to explain that this field should be accompanied by a new quantum, which has an important impact on the nuclear structure. The reason is that it is like an electromagnetic field accompanied by photons.

Yukawa believes that there is a potential function Φ that rapidly decreases with the increase of distance r in the field describing the interaction between neutrons and protons. This potential function satisfies the stationary wave equation similar to the electromagnetic wave equation, and its time-free expected form is

$$\Phi = \pm g^2 \frac{e^{-\lambda r}}{r} \tag{1}$$

Where g is the constant representing the interaction strength and λ is the undetermined constant. The quantum of the force field appears in this potential function, and its characteristic quantity is the mass m, which is an undetermined parameter here. Whether or how this characteristic mass can be determined determines the fate of the theorization of the above-mentioned idea. Yukawa believes that the potential function should satisfy the lower wave equation

$$\left(\Delta - \frac{1}{c^2}\frac{\partial^2}{\partial t^2} - \lambda^2\right)\Phi = 0 \tag{2}$$

Then the matrix is introduced to define that there are two opposite unit results, representing the neutron state and the proton state respectively,

$$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} = \pm 1 \tag{3}$$

Then equation (2) is rewritten into a new form with matrix

$$\left(\Delta - \frac{1}{c^2}\frac{\partial^2}{\partial t^2} - \lambda^2\right)\Phi = -4\pi g\tilde{\psi}\frac{1}{2}\left\{\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \pm i\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}\right\}\psi \tag{4}$$

Where ψ and $\tilde{\psi}$ are a pair of conjugate wave functions representing heavy particles. The sign in front of the complex matrix corresponds to the proton to neutron transition and the inverse transition respectively. A large number of equations related to neutrons and protons without causality are omitted here. Yukawa also lists platzwechselintegral called the Heisenberg function

$$J(r) = -g^2 \frac{e^{-\lambda r}}{r} \tag{5}$$

It is claimed that the spin of the lowest energy state of the Hamiltonian square operator H^2 is 0, which is different from that Heisenberg takes $J(r)$ as positive, and the experiment requires that the spin of the lowest energy state with a negative sign above is II. The two constants g and λ in the formula will be determined experimentally.

The following description that seems to have a subtle relationship is that the Φ– field should be quantized according to the general method of quantum theory, the neutrons and protons obey Fermi statistics, the quantum accompanying the Φ– field should obey Bose statistics, and the quantization can be carried out according to the method similar to the electromagnetic field. The lower limit of the law of conservation of charge requires that the electron charge quantum is e or $-e$, and the field quantity Φ corresponds to the operators that increase the negative charge quantum number and decrease the positive charge quantum number 1 respectively. Then, the momentum operator and energy operator of quantum mechanics are used to define an equation between the undetermined constants λ and m,

$$\hat{p}^2 = -\hbar^2\Delta, \quad \hat{W} = i\hbar\frac{\partial}{\partial t}, \quad mc = \lambda\hbar \tag{6}$$

The reduced Planck constant $\hbar = h/2\pi$ in the original text is written as Planck constant h. This introduction has been modified one by one, the same below. Then it is claimed that the wave equation satisfied by OO in free space should be written as follows

$$\left(\hat{p}^2 - \frac{\hat{W}^2}{c^2} + mc^2\right)\Phi = 0 \tag{7}$$

Yukawa's conclusion is that the quantum of the adjoint field of neutron proton interaction has an appropriate mass$m = \lambda h/c$, which actually belongs to the repeated statement of no causality for the above definition.

Then take the potential function$\Phi = \Phi'(r)\, e^{i\omega t}$, where $\omega = (W_N - W_p)/\hbar$, W_N and W_p are the energies of neutrons and protons respectively. Thus, equation (4) is rewritten as following

$$\left\{\Delta - \left(\lambda^2 - \frac{\omega^2}{c^2}\right)\right\}\Phi' = -4\pi g\nu u \tag{8}$$

Yukawa claims that the solution to the equation is

$$\Phi' = g \iiint \frac{1}{|\mathbf{r}-\mathbf{r}'|} \exp\left(-\sqrt{\lambda^2 - \frac{\omega^2}{c^2}}\,|\mathbf{r}-\mathbf{r}'|\right) \tilde{\nu}(\mathbf{r}')\, u(\mathbf{r}')\, d\nu' \tag{9}$$

It seems that the initial expectation, that is, the key potential function of the nuclear force field, has only been mentioned here. However, from hypothesis (1) to equation (9), Yukawa's paper describes a large number of irrelevant and non causal contents, which may be unprecedented.

As for equation (9), only from the formal point of view, if $\lambda^2 > \omega^2/c^2$, then $\left(\lambda^2 - \omega^2/c^2\right)^{1/2}$ is a real number, and Heisenberg function (5) has the following form

$$J(r) = -g^2 \frac{1}{r} \exp\left(-\sqrt{\lambda^2 - \frac{\omega^2}{c^2}}\, r\right) \tag{10}$$

Where $\sqrt{\lambda^2 - \omega^2/c^2}$ is determined by the absolute value $|W_N - W_P|$ of the energy difference between neutrons and protons. When the latter W_P approaches mc^2, it becomes smaller and smaller, which is explained that the interaction range between neutrons and protons increases with the increase of $|W_N - W_P|$. If $\lambda^2 < \omega^2/c^2$, $\sqrt{\lambda^2 - \omega^2/c^2}$ becomes a pure imaginary number, and the potential function Φ represents a spherical undamped wave. Yukawa's explanation is that through the transition of heavy particles from the neutron state to the proton state, quantum energy greater than mc^2 can be emitted in outer space, provided that $|W_N - W_P| > mc^2$. The velocity of $\Phi-$wave is greater than the speed of light, but the group velocity is still less than the speed of light, just like the electron wave. The reason why the quantum with such a large mass (if they ever existed) has not been found may be that the mass $\sqrt{\lambda^2 - \omega^2/c^2}$ is so large that the condition $|W_N - W_P| > mc^2$ cannot be realized in ordinary nuclear conversion.

At the end of the follow-up paper on the interaction of elementary particles II[14] published separately, Yukawa introduced the mass m repeatedly mentioned above. What it means is that street and Stevenson have obtained more evidence for the existence of new particles. The mass is consistent with the result of Compton wavelength estimation in later textbooks, which is about $130\,(1 \pm 25\%)\,\mathrm{Mev} \cong 268.5 m_e$. If this mass is accepted as the mass m of the meson, then it is speculated that the range of the nuclear force is

$$\frac{1}{\lambda} = \frac{\hbar}{mc} \cong \frac{\hbar}{268.5 m_e c} \tag{11}$$

Considering equation (10), the specific form of the initially expected potential function (1) is written as

$$\Phi = \pm g^2 \frac{1}{r} e^{-\frac{mc}{\hbar} r} \tag{12}$$

This seems to describe the short-range force.

The physics community believes that the mass estimates listed by Yukawa are consistent with the mass $273 m_e$ of $\pi^{\pm}$ meson found in cosmic rays in 1947 and the mass $264 m_e$ of π^0 meson found in 1950. The π meson is thus generally accepted as a quantum of the nuclear force field. Yukawa was rewarded by authoritative organizations. His unprecedented success enhanced the credibility of the theory, and the meson theory of nuclear forces became popular and developed. It is now generally believed that nucleons interact with each other through mesons.

3 Serious problems of Yukawa meson theory of nuclear forces

The original intention of Yukawa meson theory of nuclear forces is very simple. In order to accurately calculate the binding energy of nuclear β decay, it is assumed that there is a centrosymmetric potential function describing the nucleon interaction, and an operator equation with the assumed potential function as its exact solution is sought. Then, it is tried to prove through experiments that the integral constant in the solution of the equation is consistent with the expectation of the intensity of nuclear force interaction, and it is determined that the mass in the potential function is the mass of the new particle sought.

As we know, as the most basic law of material interaction, it is impossible to find it through the operator equation. We have also proved that it is impossible to determine the parameters representing the interaction intensity in the Yukawa function through experiments, although the assumed Yukawa potential function has a lower limit in theory. Yukawa's papers and the papers he collaborated with his students did not really solve any problems. Even today's scientists can not find the nuclear force potential function through the operator method. At first glance, however, Yukawa's paper seems to be well described, as if it had really solved a problem. After careful reading, you will find that Yukawa's paper does not list a large number of equations that appear abstruse but have no logical relationship, and has written a large number of hypothetical explanations of non causal relationship. The key procedure covered by the whitewash is to describe the expected solution of equation (12) by referring to the real solution of equation (8). This is very much like a kind of deceptive anti science behavior that deliberately confuses right and wrong. In fact, equation (9) is only the formal solution of equation (8) rather than the real solution, and the explanation of formal solution (9) in the case of $\lambda^2 < \omega^2/c^2$ is com-

pletely right and wrong. In Yukawa's paper, the reduced Planck constant $\hbar = h/2\pi$ is written as Planck constant h, and it is obvious that the error of term m^2c^2 with momentum square dimension in equation (7) is written as term mc^2 with energy dimension. These are by no means clerical mistakes! The writing error of the former exposes that the author is very unfamiliar with quantum mechanics. In particular, the writing error of the latter exposes that the author is not familiar with the solution of the wave equation and does not really solve the corresponding wave equation, because the clerical error of the equation can always be found and corrected in time in the process of solving the equation. All the descriptions and conclusions are more likely to come from the fuzzy memory of relevant literature, of course, the play of which is very random. Because of this, the real solution of the equation is ignored, and the difference between the formal solution and the real solution and their different physical meanings has not been paid attention to, but there have been random explanations and wrong conclusions about the virtual exponential solution.

Yukawa meson theory of nuclear forces, qualitatively speaking: 1) it has not really proved that the medium of nuclear force is meson; 2) An operator equation is not constructed successfully, which shows that the solution of the equation is the desired function; 3) It is impossible to prove that the mass in the potential function is the mass of the meson; 4) The expected binding energy of β decay cannot be calculated; 5) Ignoring the hypothesis that there are mesons in the nucleus will completely negate the serious consequences of the nuclear mass measurement results in history; 6) It is full of false or non causal explanations. It is puzzling why such a paper equivalent to machine generation has been widely recognized and developed in the physics field for nearly a century, and is still developing today. Yukawa meson theory of nuclear force being simply summarized to that, the logical construction process is to knead the mathematical expressions and mathematical equations that have no causal relationship together, list the concepts and equations of quantum mechanics and particle physics without really understanding their significance, introduce the wave equation of quantum mechanics and cannot correctly solve the wave equation, especially the calculation of Dirac quantum force matrix, More than 80% of the space has nothing to do with the construction of potential function. However, the behavior catered to the trend of Dirac quantum theory and particle physics at that time, giving readers the illusion of profound knowledge. To put it bluntly, Yukawa's paper is simply the dream language of insane patients. Regardless of mathematical equations or language descriptions, they deliberately go around the Bush and put together the cutting-edge physics vocabulary, physical equations and the names of celebrities of the era that has no logical relationship. From equation (1) to equation (13), including the Hamiltonian expressed by the matrix in the middle, few points can be proved. Yukawa meson theory of nuclear forces is very angry to read! The only thing worth thinking about is the quantitative relationship between relativistic operator equation and potential function expectation (1), which needs to be discussed in detail and given a scientific answer.

The electric field strength and potential satisfy the operator equations. The solutions of these operator equations of course contain the electric field strength or potential, but usually there are other solutions. For unknown interaction forces, the solution of an operator equation may not be the potential function describing the interaction. Construction of wave equation requires a physical model. Equation (2) is a wave equation constructed according to the expected function (1). Equation (7) is an operator equation of relativistic momentum energy relationship. Its solution is not Yukawa's expected potential function, but Bessel function.

Yukawa assumes that there is a function with parameters to be determined in the nucleon interaction, and considers that it satisfies the wave equation (1), and then assumes that the parameters to be satisfied with the relationship, $mc = \lambda h$, and then compares the wave equation with the relativistic operator equation, suggesting that the assumption is correct. Here, with good intentions, and the middle description goes around a lot, which distracts the reader's attention. It is very cunning. The real motive is covered up. However, the assumption belongs to the assumption after all. The so-called potential function (1) must have

$$\frac{1}{c^2}\frac{\partial^2 \Phi}{\partial t^2} = 0 \tag{13}$$

This belongs to the steady-state meaning of the real wave equation[15]

$$\nabla^2 \psi + \frac{4\pi^2}{\sigma c^2}(W - U)\psi - \frac{1}{c^2}\frac{\partial^2 \psi}{\partial t^2} = 0 \tag{14}$$

with total energy W and potential energy U introduced by Dongfang. Where $\sigma$is a determinable constant and c is the speed of light. It must be pointed out that if the steady-state meaning of the Dongfang real number wave equation is selected, the real number wave equation (14) must be used. However, with this choice, even if U in the real wave equation is arbitrarily removed and the wave function ψ is replaced by the potential function Φ, the potential function (1) cannot be derived. The steady-state meaning of the imaginary wave equation in quantum mechanics is

$$\frac{1}{c^2}\frac{\partial^2 \psi}{\partial t^2} = -\frac{W^2}{\hbar^2 c^2}\psi \tag{15}$$

Referring to the operator definition (6), equation (2) and

equation (7) are regressed as

$$\begin{aligned}\left(\Delta+\frac{W^2}{\hbar^2c^2}-\lambda^2\right)\Phi=0\\ \left(\Delta+\frac{W^2}{\hbar^2c^2}-\frac{m^2c^2}{\hbar^2}\right)\Phi=0\end{aligned}\tag{16}$$

These two equations can only repeat the assumption $\lambda\hbar = mc$ of the last term of the definition equation (6). Therefore, it is impossible to derive the potential function (1) by choosing the steady-state meaning of the imaginary wave equation in quantum mechanics.

There is no meson in the nucleus. Otherwise the mass of the nucleus or atom will not be expressed by the mass number in the periodic table of elements. Perhaps the most thought-provoking question is, how can the interaction between nucleons in atomic nuclei be dominated by mesons and derive a huge meson theory of nuclear forces?

4 Distorted logic of tearing and dismembering operator equations

Ignoring for the time being the large-scale imitative mathematical explanation without causality in Yukawa meson theory of nuclear forces, Yukawa's theory is equivalent to directly putting forward two assumptions: 1) the potential function of nucleon interaction is equation (1), and it is the solution of the operator equation (7) of relativistic momentum energy relationship; 2) Mesons exist in the nucleus, and the mass in the potential function is the mass of mesons.

Trying to prove these hypotheses, Yukawa meson theory seriously distorts the mathematics, which is manifested in many aspects. The main ones are: a) the so-called equation representing the calculated values of the neutron state and proton state matrix (3) is not tenable; b) The solution (9) of equation (8) listed is only a situation solution, and the explanation of the physical meaning of the formal solution in the case of $\lambda^2 < \omega^2/c^2$ completely reverses right and wrong; c) The introduction of Heisenberg function (1) used as an indirect proof of the expected function (12) does not constitute a causal relationship with the expected potential function (12); d) Introducing δ function to rewrite relativistic momentum energy operator equation is tearing and dismembering the existing equation, which is an anti logical behavior; e) The specific form of the expected potential function (12) is the pseudo solution of the relativistic operator equation. The last two aspects are discussed in detail here.

In order to disguise the expected potential function (1) as a logical inference, Yukawa meson theory of nuclear forces rewrites the operator equation (7) of relativistic momentum and energy relationship into equation (8). However, the specific form (12) of the expected potential function listed at the end is obtained from the mutilated equation after secretly deleting the energy term (i.e. $W = 0$) in equation (8), i.e. equation (16), and introducing irrelevant equations in the middle is to cover up the anti logic characteristics of its operation. Later textbooks pushed Yukawa meson theory of nuclear forces, adding fuel to the flames by introducing the δ function to write the mutilated equation into a fashionable and scholarly form

$$\left(\Delta-\frac{m^2c^2}{\hbar^2}\right)\Phi=-4\pi g\delta(r)=\begin{cases}-4\pi g & (r=0)\\ 0 & (r\neq 0)\end{cases}\tag{17}$$

The only solution of this mutilated equation is the so-called Yukawa potential function

$$\Phi=g\frac{1}{r}\exp\left(-\frac{mc}{\hbar}r\right)\tag{18}$$

Where g is an integral constant, which needs to be determined by the definite solution conditions, but cannot be determined in practice. Changing the operator equation (8) or (16) into the mutilated equation (17) essentially belongs to tearing and dismembering the relativistic momentum energy equation, integrating the mutilated equation, and then expressing the undetermined integral constant with g, claiming that this undetermined integral constant represents the strength of the nuclear force, and the result of the integration is the potential function of the nuclear force, which is a complete blasphemy to mathematics and physical logic. The expected solution (12) or (18) is only the pseudo solution of the operator equation (2) or the relativistic operator equation (7) originally set by Yukawa meson theory.

Although we can prove that the equation of the relationship between relativistic momentum and energy is not correct, the relativistic equation does not lose its physical meaning. Yukawa's tearing and dismembering of the relativistic momentum energy equation overturned the most basic physical meaning. The second equation of equation (7) or (16) is the relativistic momentum energy operator equation of free particles. The definition of the relativistic energy W of a free particle comes from the relativistic kinetic energy theorem

$$\begin{aligned}\int_0^v\mathbf{F}\cdot d\mathbf{r}&=\int_0^v\frac{d}{dt}\left(\frac{m\mathbf{v}}{\sqrt{1-v^2/c^2}}\right)\cdot d\mathbf{r}\\ &=\frac{mc^2}{\sqrt{1-v^2/c^2}}-mc^2\\ &=E_k-0\end{aligned}\tag{19}$$

Where the kinetic energy $E_k > 0$, and the relativistic energy

$$W=\frac{mc^2}{\sqrt{1-v^2/c^2}}=E_K+mc^2>mc^2\tag{20}$$

The key trick of Yukawa's nuclear force meson theory is to make $W=0$ in disguised form to give a mutilated equation (17) that is not only of no physical significance but also completely wrong, and then use the mutilated equation (17) to piece up the desired solution (18), giving people the illusion that the function (18) is from the relativistic wave equation. This kind of operation is very cunning and unprecedented. It is not an unintentional error in mathematical knowledge, but a deliberate distortion of mathematical rules, which is a blasphemy to scientific logic.

Mathematicians and theoretical physicists should know that the general solution of the second equation of equation (7) or (16) is the product of angular spherical harmonics and radial spherical Bessel functions[16] with oscillatory properties. Therefore, capturing the light of the relativistic wave equation, which was popular for a while, can not actually derive the so-called Yukawa potential function (18). In order to highlight the singular point of the general solution and make a trade-off, here I use the convergent series to express the solution of equation (7) or (16). The specific form is

$$\Phi=\begin{cases} C_{l+1}\left(\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}\right)^{l+1} r^l \exp\left(i\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}r\right)\left[\displaystyle\sum_{n=0}^{\infty} b_n\left(\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}r\right)^n\right] Y(\theta,\varphi) \\ C_{-l}\left(\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}\right)^{-l} \dfrac{1}{r^{l+1}} \exp\left(i\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}r\right)\left[\displaystyle\sum_{n=0}^{\infty} d_n\left(\dfrac{\sqrt{W^2-m^2c^4}}{\hbar c}r\right)^n\right] Y(\theta,\varphi) \end{cases} \tag{21}$$

It can be called the Dongfang function. Perhaps we should all solve the equations by ourselves without completely relying on the conclusions of the textbooks. Otherwise we will ignore the different physical meanings of the solutions in different situations. Where C_{l+1} and C_{-l} are undetermined integral constants, $l=0,\ \pm1,\ \pm2,\ \cdots$, and the coefficients of the series satisfy the recursive relationship

$$\begin{aligned} b_{n+2} &= -\frac{4(n+l+2)(n+l+1)}{(n+2l+3)(n+2l+2)(n+2)(n+1)}b_n \\ d_{n+2} &= -\frac{4(n-l+1)(n-l)}{(n+2)(n+1)(n+1-2l)(n-2l)}d_n \end{aligned} \tag{22}$$

By substituting (21) into equation (17), it can be verified that the recursive relation (22) is valid. If Φ is a wave function in the meaning of Born's statistical interpretation, the viewpoint of traditional quantum mechanics is to normalize the wave function to determine the integral constant; If Φ is all kinds of potential functions with point radiation properties, including point charge potential, the integral constant is determined by experiment.

The so-called Yukawa meson theory of nuclear forces obviously does not specifically solve equation (16) according to the requirements of mathematical norms, but only writes the solution of equation (8) or (16) in the form of (9) according to the impression of Green's function

$$\Phi'=g\iiint \frac{1}{|\mathbf{r}-\mathbf{r}'|}\exp\left(-\sqrt{\lambda^2-\frac{\omega^2}{c^2}}\,|\mathbf{r}-\mathbf{r}'|\right)\tilde{\nu}(\mathbf{r}')\,u(\mathbf{r}')\,d\nu'$$

Then reference the Heisenberg function

$$J(r)=-g^2\frac{1}{r}\exp\left(-\sqrt{\lambda^2-\frac{\omega^2}{c^2}}r\right)$$

Distract readers' attention, pretend to discuss real number solutions and imaginary number solutions, use irrelevant energy $mc^2=\hbar\omega$ sophistry to reverse the Bessel function of the solution of the equation, explain the oscillation function of equation (16) as an exponential function solution, and finally write the expected function (18) to achieve personal goals.

Listing too many specious equations for unnecessary explanation, and then interpreting the oscillation function solution of the equation as an exponential function solution; or tear and dismember the known operator equation and use the solution of the mutilated equation to perjure the expectation function. The essence of behavior is to resort to mathematical equations for fraud. Its absurd logic fools physics scholars all over the world and steals fame. Its nature is very bad and should be widely condemned.

5 Uncertainty of undetermined mass in Yukawa function

Relativity is a theory that can be systematically proved to be incorrect. However, it is much easier to prove the error of relativity than to expose Yukawa's chaotic meson theory of nuclear forces. This is because the theory of relativity has its independent mathematical logic, while the so-called Yukawa nuclear force meson theory is purely mathematical tearing and patchwork. So, is it possible that the distortion or dismemberment

of the wrong theory will produce a correct theory, so the so-called Yukawa potential function pieced together with the meson mass can be preserved? Although this probability is very low, in order not to omit some possible results that can arouse people's interest, we still add to prove that there is no trace connection between mesons and Yukawa function, or even if there is a reasonable equation derived potential function (18), it is impossible to determine that the mass in this potential function corresponds to mesons.

Here again, the universal logic test principle called Dongfang unity principle is introduced: *The result of the transformation of the mathematical form of the natural law in different metrics to the same metric is unique.* The united principle is described in detail as follows: *There is a definite transformation relationship between different metrics describing the natural law, and the natural law itself does not change due to the selection of different metrics. When the mathematical expression of natural laws under different metrics is transformed into one metric, the result must be the same as the inherent form under this metric, 1=1, meaning the transformation is unitary*[12,17,18]. The United principle is not only an efficient tool for logic testing, but also an efficient tool for establishing new theories. It can help us test whether a theoretical reasoning conforms to logic from different angles. A theory that conforms to the unitary principle is not necessarily a scientific theory or a correct theory, and it must be wrong to violate the correction principle. Therefore, the establishment of physical theory must consider whether it conforms to the unity principle. The error nature of theories and experimental reports that violate the unitary principle is usually very serious. In particular, if the experimental report violates the unitary principle, it will expose lies.

Let us now prove the unreliability of constructing operator equations with respect to mass. According to Maxwell's electromagnetic theory, the electrostatic potential ϕ of a point charge with electric quantity q in a medium with dielectric constant ε satisfies the operator equation

$$\Delta\phi = \frac{q}{\varepsilon}\delta(r) = \begin{cases} \frac{q}{\varepsilon} & (r=0) \\ 0 & (r\neq 0) \end{cases} \tag{23}$$

Assuming that there is an unproven logic that allows the introduction of δ function to directly write the operator equation about mass (17), then by selecting the gravitational field metric, electromagnetic field metric and nuclear force field metric at the same time, the operator equation satisfied by the potential functions of the three fields can be written at the same time

$$\begin{aligned} \left(\Delta_G - \frac{m_G^2c^2}{\hbar^2}\right)\Phi &= -4\pi g_G\delta(r) \\ \left(\Delta_\alpha - \frac{m_\alpha^2c^2}{\hbar^2}\right)\Phi &= -4\pi g_\alpha\delta(r) \\ \left(\Delta_\sigma - \frac{m_\sigma^2c^2}{\hbar^2}\right)\Phi &= -4\pi g_\sigma\delta(r) \end{aligned} \tag{24}$$

Where m_G, m_α and m_σ respectively represent the masses of the medium quantum of the gravitational field, the medium quantum of the electromagnetic field and the medium quantum of the nuclear force field. So there are three potential functions.

$$\begin{aligned} \Phi_G &= \pm g_G^2\frac{1}{r}e^{-\frac{m_Gc}{\hbar}r} \\ \Phi_\alpha &= \pm g_\alpha^2\frac{1}{r}e^{-\frac{m_\alpha c}{\hbar}r} \\ \Phi_\sigma &= \pm g_\sigma^2\frac{1}{r}e^{-\frac{m_\sigma c}{\hbar}r} \end{aligned} \tag{25}$$

So, what is the reason why $m_G = 0$, $m_\alpha = 0$ and $m_\sigma = m_\pi$ are inevitable conclusions? Obviously, there is no answer. Just because experimental physicists have observed π mesons, arbitrarily claiming that $m_\sigma = m_\pi$ is not in line with scientific logic, and considering that function (18) is a potential function of nuclear force interaction dominated by meson media is obviously a fluff. It can be seen that the later textbooks introduced δ function into Yukawa meson theory of nuclear forces, which did not increase the logic power, but brought more trouble. The logic of Yukawa nucleon meson theory to determine the meson mass violates the unitary principle, and the conclusion is only an anti scientific assumption.

To sum up, we draw a conclusion of universal significance: it is impossible to construct an operator equation about unknown mass, so that the solution of the equation becomes a potential function describing the action of unknown force without logical contradiction, so as to accidentally discover a new basic law of material interaction.

6 The formation of nuclei cannot accommodate mesons

If Yukawa meson theory of nuclear forces discards the twisted logic of tearing and dismembering relativistic operator equations to piece up the so-called potential function, and only assumes that mesons are the medium of interaction between nucleons, is this assumption possible?

In fact, according to the well-known common sense, the mass difference between neutrons and protons is much smaller than that of mesons, indicating that neutrons cannot be constructed by protons and mesons; Considering the binding energy of the atomic nucleus,

neutrons and protons combine to form the atomic nucleus to lose mass, and it is impossible to absorb new particles to make them become the medium quantum for the nuclear force interaction between Nucleons to take effect. Therefore, middle school students who understand the basic knowledge of atomic nuclei can also prove that there is no meson in atomic nuclei, and Yukawa's nuclear force meson theory is not tenable! In order to popularize this basic knowledge to middle school students in the future, so that more physics readers will no longer blindly listen to the lies of well-known physicists, these simple calculation equations and results are listed below. According to the recent evaluation of atomic mass[19,20], the internationally recommended basic physical constants[21] may be more reliable. The masses of electrons, protons and neutrons are as following,

$$\begin{aligned} m_e &= 9.109383\ 56(11) \times 10^{-31}\text{kg} \\ m_p &= 1836.15267389(17) m_e \\ m_n &= 1838.68366158(90) m_e \end{aligned} \tag{26}$$

And the mass of π meson is about

$$m_\pi \cong 268.5 m_e \tag{27}$$

The mass of neutrons is slightly larger than that of protons, and the mass difference between the two is

$$m_n - m_p = 2.53098769(73) m_e \tag{28}$$

The result is only $2.53/268.5 \cong 0.0094$ times the mass of mesons, which is far less than the mass of mesons. This indicates that neutrons cannot be composed of protons and mesons, and also indirectly indicates that the interaction medium between neutrons and protons cannot be π mesons.

On the other hand, taking deuteron as an example, the calculation of its binding energy can evaluate that the medium of interaction between neutrons and protons is not mesons. A deuteron consists of a proton and a neutron. The mass of a deuteron is

$$m_d = 3670.48296785(10.13) m_e \tag{29}$$

The binding energy of deuteron is expressed in the unit of electron mass, and the result is

$$\Delta M_\text{d} = m_p + m_n - m_d = 4.35336762(94) m_e \tag{30}$$

This means that the deuteron formed by the combination of a neutron and a proton loses the equivalent of 4.4 electron masses, rather than absorbing a π meson to make the nuclear gravity between neutrons and protons in the deuteron take effect. Therefore, the composition of deuterons cannot be related to π meson and other particles with mass. The calculation methods of other nuclei are similar, and the results are consistent: it is impossible to absorb any other leptons, mesons and baryons when the nucleus is formed.

The simple calculation results that the above middle school students are good at are enough to prove the common sense conclusion: there is no meson in the atomic nucleus at all, and the nucleons of the atomic nucleus cannot rely on the control of mesons that do not exist in the atomic nucleus to generate nuclear force! Yukawa's hypothetical meson theory of nuclear forces violates the unity principle. It is a lie and sophistry that randomly accumulates a large number of irrelevant and wrong mathematical formulas to whitewash itself.

7 Conclusions and comments

The chaotic logic of Yukawa meson theory of nuclear forces without causality is very angry. Trying to correct its distorted calculations or explanations cost years of time and a lot of energy but ended in failure.

Far from being able to compare with the theory of relativity which can also prove that it is not tenable, Yukawa's meson theory of nuclear forces makes us unable to have any respect for it. It's too much low-level logical errors and cunning sophistries make people angry. 1) Yukawa knows only a little about the basic theories of quantum mechanics and particle physics, and there are principled errors in the writing of mathematical expressions from beginning to end; 2) Listing a large number of non causal modern physical concepts, nouns, equations and mainstream achievements, reversing right and wrong, concocting untenable logic, whitewashing academic foundation, catering to celebrities and controlling readers' thinking; 3) Do not understand the significance of the basic equations of relativity, tear apart and dismember the operator equations of the relationship between momentum and energy, and disguise assumptions as mathematical inferences; 4) The meaning of wave equation and the analytical theory of wave equation are not really grasped, and the result of Bessel function is distorted into a simple expected potential function, misleading physics readers; 5) Demonize the mesons that do not exist in the atomic nucleus into the medium of nucleon interaction, and fool the physical world. Because there are a large number of serious uncorrectable mathematical errors and untenable physical logic, Yukawa's meson theory of nuclear forces is only anti scientific logic.

Up to now, the new theories about the development of relativity and the experimental reports about relativity have always been able to excite the hearts of millions of people and shake the authoritative organizations of physics. However, assuming that the theory of relativity is completely correct, and then establishing a theory with the theory of relativity, we should first consider that the inference of relativity is different from that of Newtonian mechanics only when describing high-speed motion and it does not fundamentally change the law of material interaction. This means that the existence of the law of interaction of matter can never take relativi-

ty as a sufficient and necessary condition. Therefore, it is obviously self deception to claim that the most basic law of material interaction has been discovered through relativity. It seems reasonable to use the experimental data to construct a nuclear force potential function. The reason why it can not be realized may be that a large number of experimental data on high-energy physics are far from enough to be used to construct the nuclear force potential function. However, the nuclear force potential function, which is the most basic law of matter interaction, can be easily obtained by tearing and dismembering the relativistic equation of momentum and energy, which obviously exposes the fatal defect of thinking. From this point of view, experimental scientists of particle physics should first question and oppose the meson theory of nuclear force. However, if, as experimental scientists in particle physics, we have no confidence or courage to question and oppose the meson theory of nuclear force, does it prove that we have never had any confidence in our own experimental data and reports? Not to mention that outsiders do not always believe our experimental reports, which are often immersed in error analysis. The experimental report can also test its reliability with the principle of logical test.

Using the unitary principle, we can widely test the principled errors of modern physics represented by relativity, and find traces of tampering with and fabricating observation data in experimental reports. The so-called achievements of relativistic quantum mechanics, meson theory of nuclear forces and gravitational wave of spiral binary stars as relativistic applications seem to be supported by experiments. If the inferences of erroneous theories and anti scientific theories are widely supported by experiments, is it not in itself the evidence of lies? What it usually exposes is the behavior of simulating observation data, computer-generated observation data and manual tampering with observation data, or the inference is exaggerated without substantive breakthrough. The unitary principle has a powerful logic checking function. 1) Using the unitary principle, the complete space-time transformation is found[12], which shows that the Lorentz transformation is not a complete transformation between the time coordinate parameters in each inertial system. Therefore, it is proved that the Einstein assumption of constant speed of light is not tenable within the framework of relativity, which means that relativity is not a scientific theory; 2) The application of the unitary principle has discovered the morbid equation of quantum numbers[22] hidden in quantum mechanics, which is one of the fatal logical contradictions of quantum mechanics. It shows that the work done by developing quantum mechanics in the past without revealing the essence of quantum mechanics may have very little real scientific significance except for the positive impact of physical thought; 3) Using the unitary principle, it is found that the Dirac energy level formula written by the Dirac equation of relativistic quantum mechanics applied to the hydrogen atom is a pseudo solution of the equation[23], so the challenge solution of the Dirac equation of the hydrogen atom is proposed; 4) Using the unitary principle, it is also found that the frequency distribution of LIGO signal not only does not conform to the relativistic frequency equation[22], but also completely negates the relativistic frequency equation. LIGO's spiral binary black holes failed to merge[24, 25]. Further verification of the LIGO experiment report by the unitary principle will prove that the LIGO signal belongs to the ground signal. The unitary principle is also used here to draw a totally negative conclusion from the test of Yukawa meson theory of nuclear forces. The so-called gravitational wave that detects the merging of ancient spiral double black holes has exactly the same properties as the meson theory that experimentally confirms the nuclear force. The meson theory of nuclear force only tears and dismembers the relativistic momentum square operator equation, and describes the irrelevant meson as a sophistry of the medium quantum of the nuclear force field. Detecting the so-called gravitational wave of the fusion of spiral double black holes is not even sophistry, but a lie.

We also discussed an exceptional question: is it possible that the distortion or dismemberment of a wrong theory can produce a correct theory by accident? Taking the meson theory of nuclear force as an example, for a stationary atomic nucleus, there is only a formal difference between the relationship between relativistic momentum and energy and the relationship between momentum and energy in Newtonian mechanics. However, Yukawa function can not be obtained by using the operator equation of the relationship between momentum and energy in Newtonian mechanics. This obviously violates the unity principle. The theory that violates the unity principle cannot be correct. Mesons exist, but there are no mesons in the nucleus. Even the philosophy of meson theory of nuclear forces has no merit. Quietly reviewing the origin of Yukawa meson theory of nuclear forces, comparing the operator equation of relativistic momentum and energy relationship with that of Newtonian mechanics, we can find and falsify how the so-called Yukawa function distorts mathematics and violates the unity principle. Yukawa meson theory of nuclear forces is an epitome of the eagerness for quick success and instant benefit in modern physical theory and experimental research: it does not discuss the inevitable causal relationship, emphasizes personal views and explanations, makes false conclusions, and can always list a large number of plausible physical concepts, mathematical equations and references without causal relationship, refusing to accept the questions of readers. How long will this anti scientific trend, described as scientific research, dominate the theoretical physics community? Can the lies of physics really cover the sky and the sun forever?

To sum up, Yukawa's meson theory of nuclear forces

is not a scientific theory and must be completely abandoned due to its serious distortion of mathematical and physical principles, random tearing and dismembering of known equations, illogical patchwork of personal expectation functions, arbitrary interpretation of events without cause, and whitewashing of illusory structures that do not exist in fact.

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