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To the Theory of Everything. Phenomenology

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Abstract: *Anomalies of annihilation of β^+-decay positrons in the system "^{22}Na-gaseous neon of natural isotopic composition (~ 9% ^{22}Ne)" and precedent of the theory of the complete degeneracy for para- and ortho-superpositronium in the supersymmetric N = 2 QED give grounds to represent alongside with Dirac fermions (QED) also phenomenology of a true neutral Majorana fermions (electroweak interaction/EWI and the Theory of Everything/TOE) as additional low-energy aspect of the supersymmetry (β^+-supersymmetry).*

For the first time, the prospect of analog formalization of the status of a physical observer in General Relativity and Quantum Field Theory is designated (β^+-orthopositronium formed in substance in the final state of β^+-decay type $\Delta J^\pi = 1^\pi$). Lack of this is the reason for the stagnation of the modern Standard Model.

Keywords: *system "^{22}Na-gaseous neon", quantum electrodynamics, Dirac fermions, electroweak interactions, Majorana fermions, supersymmetry, additional β^+-supersymmetry, Theory of Everything.*

This is detailed abstract of the cycle of publications in the Electronic scientific & practical journal "Researches in Science" (15) and Electronic scientific & practical journal "Modern scientific researches and innovations" (17), which discuss the extension of the modern Standard Model/*SM*, dictated by a cycle experiments of observing the anomalies of the lifetime spectra of β^+-decay positrons (γ_n-"start" - γ_a-"stop"; γ_n – nuclear gamma-quantum, γ_a – annihilation gamma-quantum) in the system of "^{22}*Na*-gaseous neon of natural isotopic composition (~ 9% ^{22}*Ne*)".

To stimulate the development of *SM* on the designated experimental base (USA/1956, 1965; Russia/1967-1987; England/1975; Canada/1975) and reasonable phenomenology (Russia/1977-2008) is a difficult task because the world community did not notice in the mentioned experiments the paradoxical correlation "^{22}*Na*-gaseous neon".

The hypothesis was confirmed by implementing critical comparative experiments with a decrease in the fraction of the ^{22}*Ne* isotope in gas (1985-1987) [1] and phenomenology developed on this basis [2]. There is no other possibility to explain the Mössbauer effect for the "start" γ_n-quantum ($E_{\gamma_n} \cong 1.274\,\mathrm{MeV}$) in the neon gas phase as manifestation (involving orthopositronium/^{T}*Ps* formed in gas in the final state of β^+-decay) a macroscopic vacuum two-sign spacelike structure – *atom of long-range action*/*ALRA* of Planck mass (alternative to counterproductive phenomenology "tachyon").

With each act of the β^+-decay of the type $\Delta J^\pi = 1^\pi$ (^{22}*Na*, ^{64}*Cu*, ^{68}*Ga*, etc.) in space-time of *complete relativity* [3] the macroscopic mass $2|M_{Pl}|$ is realized.

The SM in a state of stagnation since beginning of the search for the physical realization of the mathematical structure of supersymmetry (mid-1970s). Now that the phenomenology of the Project of a new (additional) $G\hbar/ck$-physics "outside" the light cone/Project [4] has been formulated, the essence of the problem can be briefly stated.

When physicists discuss the appearance of virtual e^+e-pairs ($E_{e^+e} \cong 2m_ec^2$, $\Delta t \cong \hbar/2m_ec^2$) in quantum Dirac vacuum does not comment on the question of the spin state of the pair. All quantum numbers of the physical vacuum are zero. Therefore, a virtual e^+e-pair can be born only in the singlet state (the total spin of the pair S = 0), i.e. in the *SM*/*QED* the birth of a virtual e^+e-pair in the bound state of triplet positronium (^TPs, spin S =1) is excluded. This state of positronium is of particular interest for explaining the anomaly in the "^{22}Na-gaseous neon" system, since virtual single-quantum annihilation is present in the dynamics of the ^TPs annihilation. This means orthopositronium oscillations in "the looking glass", where from the standpoint of a physical observer the signs of the *action* and *speed of light* are negative and $\pm M_{Pl} = \pm\sqrt{(\pm\hbar)\cdot(\pm c)/G}$. The binding energy of the ground state *Ps* is $W \cong 6.8\,\text{eV}$, the hyperfine splitting of triplet and singlet positronium energy in QED $\Delta W = {}^3W - {}^1W \cong 8.4\cdot10^{-4}\,\text{eV}$.

In *supersymmetric quantum electrodynamics*/*SQED* the virtual vacuum state of orthopositronium is possible. Precedent is presented in [5]: "… *in the case of supersymmetric N = 2 QED we find complete degeneracy for para- and ortho-superpositronium*". That is opens for physical observer the space-time "outside" the light cone, if we assume *topological quantum transition*/*TQT* in the final state β^+-decay type $\Delta J^\pi = 1^\pi$ .and ^TPs represents the analog formalization of a physical observer who (*what*) "sees" the two-sign spacelike *ALRA*-structure ("local" causality [2, 4]).

The expected implementation of the *Project* will mean that the positronium atoms generated by a positron in the final state of β^+-decay β^+-*Ps* (*TQT*) – ortho-$^3(e^+_\beta e)_1$ and para-$^1(e^+_\beta e)_0$ – are different from *QED-Ps* $^3(e^+e)_1 \backslash {}^1(e+e)_0$, and the mathematical structure of supersymmetry within Hamiltonian dynamics must be complemented by the concept β^+-supersymmetry that go back to the problems of the Hamiltonian graph and the traveling salesman problem.

In this regard, a new and low-energy limit of combining *QED* and *weak interaction* is revealed – *electroweak interaction*/*EWI*. Consideration of the *EWI* in the framework of the alternative E. Majorana [6] (true neutral fermions) becomes a strong argument of β^+-supersymmetry [7].

The fundamental unification of physical interactions (*Theory of Everything*) is achieved by filling each of the nodes of the Hamiltonian graph ($N^{(3)} \cong 1.3\cdot10^{19}$ with allotment *ALRA core* $\bar{n} \cong 5.3\cdot10^4$ in dark matter – on Earth and in a gravity field of sufficient strength) by the masses by all stable particles of matter (m_p, m_e, m_{ν_e}). The compensating structure of *ALRA* in "the looking glass" contains these masses with negative sign [2, 4].

This is a worthy occasion to discuss the unified nature of dark matter\dark energy [4].

The program of a decisive experiment was proposed [8].

REFERENCES

[1] Levin B.M., Kochenda L.M., Markov A.A., Shantarovich V.P. *Time spectra of annihilation of positrons* (^{22}Na) *in gaseous neon of various isotopic compositions*. Sov. J. Nucl. Phys., v.45(6), p.1119, 1987.

[2] Levin B.M. *About extension of Standard Model of Physics*. http://science.snauka.ru/2013/01/3279

[3] Andreev A.F. *Spontaneously broken complete relativity*. Pis'ma Zh. Eksp. Teor. Fiz., v. 36 (3), p. 82, 1982.

[4] Levin B.M. *Atom of Long-Range Action Instead of Counter-Productive Tachyon* Phenomenology. *Decisive Experiment of the New* (*Additional*) *Phenomenology Outside of the Light* Cone. Progress in Physics, v.13(1), p.p.11-17, 2017; Levin B.M. *Half-Century History of the Project of New* (*Additional*) *Għ/ck -Physics*, Progress in Physics, v.13(1), p.p.18-21, 2017. http://www.ptep-online.com

[5] Di Vecchia P. and Schuchhardt V. *N* =1 *and N* = 2 *supersymmetric positronium*. Phys. Lett., v.B155 (5/6), p. 427, 1985.

[6] Majorana E. *Teoria simmetrica dell'elettrone e positrone*. Nuono Cimento, v. 14 (4), p.p. 171-184, 1937.

[7] Levin B.M. *Supersymmetry,* β^+*-Orthopositronium and Electroweak Interaction in the Theory of Everything*. *Phenomenology*. http://web.snauka.ru/issues/2019/05/89372

[8] Levin B.M. *The Program of the Decisive Experiment to the Project of New* (*Additional*) $G\hbar/ck$ *-Physics* "*Outside*" *the Light Cone*. http://web.snauka.ru/issues/2019/04/88990

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