"... we lit beacons... in the Universe only we are alone ..."

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Abstract

Superluminal contact with extraterrestrial civilizations can be carried out either by observing the appearance of regular gaps in the CMB relic microwave background or by manipulating the state of quantum fluctuation using the dynamic Casimir effect; potentially, it is also possible to observe patterns in the relic background of Goldstone bosons – axions. It is more correct to evaluate the search for a signal on an axion background of noise as a spectrum of intermediate NeutralA - gaps in various relict backgrounds that form a recognizable pattern of NonA formed NeutralA and AntiA, which is the neutrosophic signal of NonA for us. Observation of the NonA neutrosophic signal for axions is possible with scalar/vector potential detectors based on the Aharonov-Bohm effect or on the basis of the Wolf-Bragg`s condition for X-ray diffraction/interference. The creation of axion telescopes with matrices of nano- or micron-sized pixels for observing the cosmic NonA for Rφ and RA will make it possible to establish superluminal Contact of Civilizations.

Keywords: superluminal FTL communication; axion, neutrosophy; axiom system; extraterrestrial civilization

1. Introduction

Superdeterminism [1], being currently the only workable direction in physics, dispenses with the involvement of indirect correlations and, based on the idea of total superluminal quantum entanglement of Nature, considers as a physical reality the possibility of superluminal communications in the Universe.
Superluminal contact with extraterrestrial civilizations can be performed as a manipulation of the quantum fluctuation state using the dynamic Casimir effect [2], as well as observing the appearance of regular lacuna in the relic microwave background CMB [3]. However, the analysis of the polarization of the relic radiation performed by [4] for a generation deprived us of hopes for establishing contact. Like the disastrous end of the SETI project, " ... *we lay low...*", Fermi's "*where is everyone?*» argument simply and unassumingly makes the contribution of our mind f_c in the Drake formula negligible.
In addition to these possibilities for detecting temperature anomalies or polarization of disappearing or emerging boson wavefronts, we can potentially observe patterns in a relic fermionic neutrino background and use Goldstone boson axions.
The reason that so far many experiments do not register axions, but only introduce restrictions on their properties [5], may be that we are looking for the wrong thing, the wrong place, and the wrong way.

2. Related Work

Provided we admit by saying "*we are looking for the wrong way*", we should probably realize that we are not only looking for the wrong way, but also interpret the results obtained in the wrong way. We usually look for a signal against a background of noise, focusing on the *traditional A — AntiA logic*, but the search for a signal not in the form of a significant excess of the background level, but in the form of gaps in noise, implies another logic, the logic of neutrosophy [6]. We should consider the signal A not only together with its opposite AntiA - noise, but more correctly as a spectrum of intermediate NeutralA - lacuna in various relic backgrounds, forming a recognizable pattern of NonA formed by NeutralA and AntiA, which is the NonA neutrosophic signal for us [7]. The fundamental basis for "Life at Infinite Speed" [8] is the octonion [9] of phase and group velocities

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correlated with the speed of light, including the case v & w = ∞; Eric Weisstein [10] defines this as Smarandache Hypothesis, further it will be proposed to consider this case as the Smarandache Axiom.

3. Mathematical equations, subsections, tables, and figures

So, we determine (Figure 1) the position of axions in the quantum world using plectonic symmetry in the space 2+1.

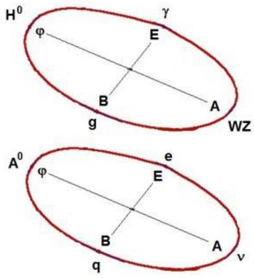

Figure 1 : Octonion correspondence of field strength and potentials to fermions and bosons

It is quite trivial to assign fermions, namely, leptons/antileptons e, μ, τ, and the photon - boson γ, to the electric component E; quarks/antiquarks q and gluons g - to the magnetic B [11]; neutrinos/antineutrinos v and vector bosons W and Z to the vector potential A; the Higgs scalar H^0 to the scalar potential ϕ. Goldstone bosons, axions A^0, also belong to the scalars, but on the fermion plane. There is no contradiction in this if we assume that the axioms are composite particles.
Their primary basis is the mass-less fermions $Q^{1/2}$ (fermion with spin 1/2, mass-less) located in the upper quadrant of the Standard Model (Figure 2) and, by analogy with mass-less fermions - neutrino $v^{1/2}$ = v (1/2-spin, mass-less) (the lower quadrant of the Standard Model), and quarks $q^{1/2M}$ = q (1/2 - spin, M - massive, left quadrant of the Standard Model), forming π mesons (pseudo - Goldstone bosons), these fermions can be called *quarkilino*. The term quarkino is occupied by Super-symmetry, and axino and C-axion also belong to SUSY logic, which complicates formalization compared to anyon/pletons symmetry and braid statistics. While remaining in the logic of the Standard model, we can also not yet include quarkilino R-parity properties in our consideration.
The interaction of two $Q^{1/2}$ quarkilinos with spins ½ - ½ = 0 in accordance with the Pauli Principle generates a stable form Q_2^0 -> A^0 similar to two electrons with anti-parallel spins in the same orbit e_2^{0M} (0 – spin, M – massive, right quadrant of the Standard Model).
Extending the assumption of the existence of mass-less $Q^{1/2}$ fermions to all quadrants of the Standard Model allows us to notice the possibility of the existence of a spectrum of quanta with spin 2, specifically 6-tensors - mass-less Q_6^2 and massive H_6^{2M}, F_6^2 and e_6^{2M}, v_6^2 and wz_6^{2M}, G_6^2 and q_6^{2M}. It is not too bold to identify them with mass-less and massive gravitons, which may allow us to build a theory of gravity, but not with two types of carrier bosons [12], but with at least eight, two for each sector of the Standard Model.
In this model, gravitons 6-tensors propagating in space as a tensor wave of physical vacuum deformation during detection (contraction of the tensor) undergo collapse/reduction of the wave function and are registered as known quanta of the Standard Model.
The transition from the octonion representation to the sedenion/sedeon formalism allows describing massive and mass-less fields by super-symmetric scalar-vector equations for the potentials and field strengths [13].
The intermediate forms of scalar, vector, and tensor quanta that the Standard Model is richly filled with, even without higher spins, we can easily refer to Dark Matter quanta that are not observed by conventional detectors [14], [15].

2	Q_4^2	H_4^{2M}
	Q_6^2	H_6^{2M}
3/2	$Q_3^{3/2}$	$H_3^{3/2M}$
	$Q_5^{3/2}$	$H_5^{3/2M}$
1	Q_2^1	H_2^{1M}
	Q_4^1	H_4^{1M}

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	Q_6^{1}	H_6^{1M}
1/2	$\mathbf{Q^{1/2}}$	$\mathbf{H^{1/2M}}$
	$Q_3^{1/2}$	$H_3^{1/2M}$
	$Q_5^{1/2}$	$H_5^{1/2M}$
	$\mathbf{Q_2^{0} = A^{0}}$	H_2^{0M}
0	Q_4^{0}	H_4^{0M}
	Q_6^{0}	$\mathbf{H_6^{0M} = H^{0}}$
s	Q	H^0

2	3/2	1	1/2	0	s	ϕ		s	0	1/2	1	3/2	2
G_4^{2}	$G_3^{3/2}$	$\mathbf{G_2^{1} = g}$	$G^{1/2}$	G_2^{0}					F_2^{0}	$F^{1/2}$	$\mathbf{F_2^{1} = \gamma}$	$F_3^{3/2}$	F_4^{2}
G_6^{2}	$G_5^{3/2}$	G_4^{1}	$G_3^{1/2}$	G_4^{0}	g			γ	F_4^{0}	$F_3^{1/2}$	F_4^{1}	$F_5^{3/2}$	F_6^{2}
		G_6^{1}	$G_5^{1/2}$	G_6^{0}					F_6^{0}	$F_5^{1/2}$	F_6^{1}		
q_4^{2M}	$q_3^{3/2M}$	q_2^{1M} = μέσος	$\mathbf{q^{1/2M} = q}$	q_2^{0M} = μέσος		B	E		e_2^{0M}	$\mathbf{e^{1/2M} = e}$	e_2^{1M}	$e_3^{3/2M}$	e_4^{2M}
q_6^{2M}	$q_5^{3/2M}$ = Pc(4380), Ω, Δ	q_4^{1M} = Z(4430)	$\mathbf{q_3^{1/2M}}$ **= p,n**	q_4^{0M}	q			e	e_4^{0M}	$e_3^{1/2M}$	e_4^{1M}	$e_5^{3/2M}$	e_6^{2M}
		q_6^{1M}	$q_5^{1/2M}$	q_6^{0M}					e_6^{0M}	$e_5^{1/2M}$	e_6^{1M}		
2	3/2	1	1/2	0	s	A		s	0	1/2	1	3/2	2

s	ν	$W^{\pm} Z^0$
	ν_2^{0}	wz_2^{0M}
0	ν_4^{0}	wz_4^{0M}
	ν_6^{0}	wz_6^{0M}
	$\mathbf{\nu^{1/2} = \nu}$	$wz^{1/2M}$
1/2	$\nu_3^{1/2}$	$wz_3^{1/2M}$
	$\nu_5^{1/2}$	$wz_5^{1/2M}$
	ν_2^{1}	$\mathbf{wz_2^{1M} = W^{\pm} Z^{0}}$
1	ν_4^{1}	wz_4^{1M}
	ν_6^{1}	wz_6^{1M}
3/2	$\nu_3^{3/2}$	$wz_3^{3/2M}$
	$\nu_5^{3/2}$	$wz_5^{3/2M}$
	ν_4^{2}	wz_4^{2M}

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$2 \quad \nu_6^2 \quad wz_6^{2M}$

Figure 2 : Standard Model Octonion

So we are not looking for something, we are looking for bosons, axions A^0, and we need to look for their forerunner fermions $Q^{1/2}$.
We are not looking there, we are looking in the sectors of electromagnetic field strength, and we need to look in the sectors of scalar and/or vector potential.
We are not looking like this, but how?
Let's try to describe the properties of quarkilino in terms of what symmetry allows us to borrow from quarks. Quarkilino - particles with quark flavors Q_u Q_d Q_c Q_s Q_b Q_t and antiparticles Q_{u-} Q_{d-} Q_{c-} Q_{s-} Q_{b-} Q_{t-} then, in particular, the Q_uQ_{u-} or Q_dQ_{d-} quarkilino meson is an axion, a Goldstone boson with a common spin of two anti-parallel quarkilinos ½ - ½ = 0.
Baryons are quarks, but include mass-less $Q_uQ_dQ_d$ and other quarkilino hyperons. For fractional, similar to quarks, the electric charge of quarkilino we would also be sets of charged hadrons of quarkilino. But the fact that such mass-less and charged quanta are not observed in the traditional experiment, speaks in favor of the analogy of quarkilino with uncharged neutrinos.
Thus, the symmetry allows us to evaluate the quarkilino as neutral massless aromatic fermions, highly likely having color.

A. Subsection A: The relationship of axions with nucleons and mesons

Consider axion as the "fifth force F5" of boson. Illustrative values of the interaction constant F5 in the form of two sets of maximum and minimum values of aF5," not seriously " estimated by Pontecorvo [16], are shown in Table 1, and their inverse values in the coordinates of running or converging constants are shown in Figure 3.

Table 1: Estimates of the interaction constant of the Fifth force.

Interaction constants	E, GeV			
	0,01	0,1	1	100
αs	10,00	1,00	0,40	0,12
αw		0,0370	0,0357	0,0333
αe	0,0073	0,0074	0,0075	0,0078
αF5		αw*10^-1	αw*10^-3	αw*5*10^-4
		0,00370	0,00004	0,00002
		αw*10^-2	αw*10^-4	αw*10^-4
		0,000370	0,000004	0,000003
1/αs	0,1	1,0	2,5	8,3
1/αw		27,0	28,0	30,0
1/αe*3/8	51,4	50,6	49,9	48,0
1/αF5		270	28 000	60 000
		2 700	280 000	300 000
1/αF5*10^-4		0,03	2,80	6,00
		0,27	28,00	30,00

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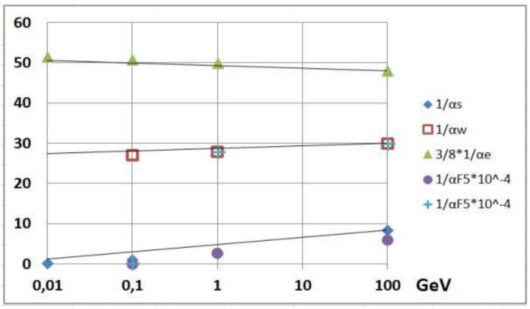

Figure 3:Position of F5 in the region of nuclear interactions

As can be seen in figure 3, the values of the maximum and minimum values of αF5 fall satisfactorily in the region of weak / strong interactions with the correction determined by the effective QCD angle of 10^-4.
The axion sets the value of the interaction constant F5 of the Pontecorvo-Pechcei-Quinn field, and the contribution of the chiral quarkilino phase or does not determine the effective symmetry breaking angle of 10^-4.
F5 - meson, that is, the Q_uQ_{u-} or $Q_dQ_{d-}^0$ - axion corresponds to the coupling constant of the weak interaction, and $Q_bQ_{b-}^0$ of the strong interaction. Due to the lack of mass, it is possible to assume the existence of $Q_tQ_{t-}^0$.
F5 in the area of weak interactions corresponds to the physics of mesons and baryons, and in the area of strong interactions – quarks and gluons.
The Pontecorvo-Maki-Nakagawa-Sakata matrix of neutrino mixing has the following literary values $\sin^2(2\theta_{12})$ = 0.857, $\sin^2(2\theta_{23})$ > 0.95, and $\sin^2(2\theta_{13})$ = 0.098.
This allows us to determine $\cos_{12}*\cos_{13}$ and $\cos_{23}*\cos_{13}$ and try to estimate the contribution of the chiral quarkilino phase as $1-\cos_{12}*\cos_{13}$ and $1-\cos_{23}*\cos_{13}$ by the values 6 ... 7 * 10^-5.
The CKM matrix Kabibbo-Kobayashi-Maskawa of mixing quarks has the following approximate values $\theta_{12} = 13^0$, $\theta_{23} = 2^0$, and $\theta_{13} = 0.1^0$.
This allows us to determine $\cos_{12}*\cos_{13}$ and $\cos_{23}*\cos_{13}$ and again try to estimate the contribution of the chiral phase of the quarkilino as $1-\cos_{12}*\cos_{13}$ and $1-\cos_{23}*\cos_{13}$ already by values 6*10^-4 ... 3*10^-2.
Thus, the contribution of the chiral phase of the quarkilino determines the amount of symmetry breaking by a value of 10^-4 lying within the range of values corresponding to the asymmetries for neutrinos 6*10^-5 and quarks 3*10^-2 and closer to their mass-less counterparts — neutrinos. And we can consider neutrino oscillations as the interaction of a weak hyper-charged neutrino with the relic background of axions [17] of the scalar/vector potential field.
The manifestation of the "fifth" force in the experiment is possible in the area where the interaction of quanta is influenced by the scalar potential. A hypothetical diagram of the intersection of proton and electron/antiproton flows for two colliders is shown in Figure 4.

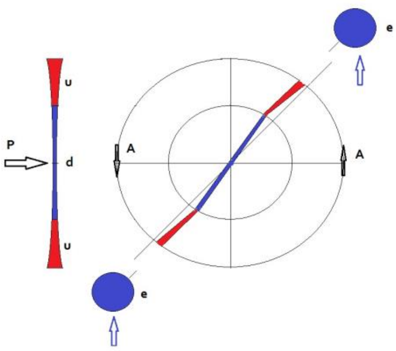

Figure 4 : Proton and electron (antiproton) Collider in the scalar potential region.

The scalar potential A allows us to make a phase shift in the movement of electrons and proton quarks at the intersection of Collider beams and create conditions for proton deformation, when u and d quarks begin to "change places" at an energy of 2 * 2.3 MeV + 2 * 0.51 MeV > 4.8 MeV (2u + 2e > d) and the proton p(938) is transformed into a resonance Δ+(1232). The subsequent appearance of almost 300 MeV "out of nowhere" in 5·10^-24 seconds will be evidence of the existence of a scalar axion field.

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In a controlled scalar field, we can also expect proton decay in the form of Zeno/anti-Zeno effects, if we assume that the measurement of the state of the proton by axions of the relic field of potentials is sufficient for the stability of the proton. If you absorb some of the axions and reduce the number of acts of measuring the state of the proton, it will disintegrate. The neutron in such an experiment will decay faster than usual (Figure 5).

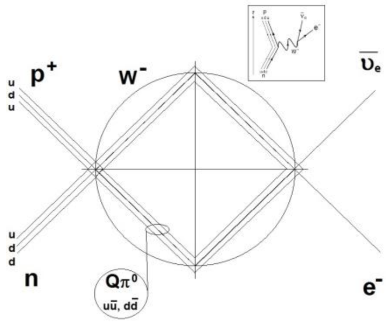

Figure 5 : Diagram of the neutron decay with oscillation of the mesons of quarkilino

This decay pattern should correspond to aromatic mesons quarkilino

$$udd + Q\,(u\underline{u}-d\underline{d}) = udu + W^- + Q(u\underline{u}+d\underline{d})$$

$$W^- + Q(u\underline{u}+d\underline{d}) + \underline{v}_e = e^- + Q(u\underline{u}-d\underline{d})$$

$$d + \underline{u} = u + \underline{d}$$

with a possible color $Qg3 = Q\,(r\underline{r}-b\underline{b})$.

If you use an additional source of axions, it will slow down the decay of the neutron. Does an excess of axions accelerate the decay of a proton? Remove the axions for proton decay or add them? Is there a proton in the position of the Hamlet's (Vladan Panković, 2009)? Is it possible to estimate the energy of an axion by interacting with a shell of virtual mesons that carry of the proton's electric charge and are responsible for interaction with the environment and proton stability?
Consider the systematization of mesons with consideration for [18], presented in Table 2.

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Table 2: Variant of the meson nomenclature.

	d					u					s					c					b				
d	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2
	b_1	a_0	a_1	a_2	a_6	b_1	a_0	a_1	a_2	a_6	K_{1B}	K^*_0	K_{1A}	K^*_2	(KK^*)	D_1	D^*_0	D_1	D^*_2	(DD^*)	B_1			B^*_2	
	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1
	π	π	ρ	ρ	ρ	π	π	ρ	ρ	ρ	K	K	K^*	K^*	K^*	D	(D)	(D^*_1)	D^*	(D^*_3)	B			B^*	
	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4
	π_2	(π_2)	ρ_3	ρ_5	a_4	π_2	(π_2)	ρ_3	ρ_5	a_4	K_2	K_2	K^*_3	K^*_5	K^*_4										
u	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2
	b_1	a_0	a_1	a_2	a_6	b_1	a_0	a_1	a_2	a_6	K_{1B}	K^*_0	K_{1A}	K^*_2	(KK^*)	D_1	D^*_0	D_1	D^*_2	(DD^*)	B_1			B^*_2	
	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1
	π	π	ρ	ρ	ρ	π	π	ρ	ρ	ρ	K	K	K^*	K^*	K^*	D	(D)	(D^*_1)	D^*	(D^*_3)	B			B^*	
	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4
	π_2	(π_2)	ρ_3	ρ_5	a_4	π_2	(π_2)	ρ_3	ρ_5	a_4	K_2	K_2	K^*_3	K^*_5	K^*_4										
s	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	13H6	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2
	K_{1B}	K^*_0	K_{1A}	K^*_2	(KK^*)	K_{1B}	K^*_0	K_{1A}	K^*_2	(KK^*)	h_1	f_0	f_1	f'_{2/f_4}	f_6	D_{s1}	D^*_{s0}	D_{s1}	D^*_{s2}	$(D_sD^*_s)$	B^0_{s1}			B^{*0}_{s2}	
	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1
	K	K	K^*	K^*	K^*	K	K	K^*	K^*	K^*	η/η'	η	$(\phi)/\omega$	ϕ/ω	ϕ/ω	D_s	(Ds)	D^*_{s1}	D^*_s	(D^*_{s3})	B^0_s			B^*_s	
	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4
	K_2	K_2	K^*_3	K^*_5	K^*_4	K_2	K_2	K^*_3	K^*_5	K^*_4	η_2	(η_2)	ϕ_3/ω_3	(ϕ_5/ω_5)	f_4										
c	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2
	D_1	D^*_0	D_1	D^*_2	(DD^*)	D_1	D^*_0	D_1	D^*_2	(DD^*)	D_{s1}	D^*_{s0}	D_{s1}	D^*_{s2}	$(D_sD^*_s)$	h_c	X_{c0}	X_{c1}	X_{c21}	X_{c22}					
	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1
	D	(D)	(D^*_1)	D^*	(D^*_3)	D	(D)	(D^*_1)	D^*	(D^*_3)	D_s	(Ds)	D^*_{s1}	D^*_s	(D^*_{s3})	η_{c1}	η_{c2}	ψ_D	J/ψ	ψ_5	B_c				
	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4
b	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2	11P1	13P0	13P1	13P2	23P0,1,2
	B_1			B^*_2		B_1			B^*_2		B^0_{s1}			B^{*0}_{s2}							h_b	X_{b0}	X_{b1}	X_{b2}	X_{b012}
	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1	11S0	21S0	13D1	13S1	23S1
	B			B^*		B			B^*		B^0_s			B^*_s		B_c					η_{b1}	(η_{b2})	(Υ_{1D})	Υ_{1S}	Υ_{2S}
	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4	11D2	13D2	13D3	13G5	13F4

The main diagonal of dd-bb repeatedly illustrates the absence of a number of mesons; their non-observation may be due to their decay due to an insufficient number of measurements in the Zeno effect when interacting with a relict axion field. Hypothetically, there are not enough axions in the scalar spectrum to ensure the observability of a number of mesons, in particular, for levels 13D1 , 13D2 , 13F4 , 13G5 , 13H6 , 13P0 , 13P1, and a number of others. The boundary of the appearance of unobservability passes in the region of meson energies ω (1650) ... ρ (1700), and a more detailed analysis of the spectrum of axions with the involvement of aromas and colors will be postponed to the virus-free future.

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B. Subsection B: Axiomatics of set theory for fermion/boson systems 3/5

However, we can consider mesons as the result of the "paradox" of color retention, and hypothetically, the confinement of quarks is similar to the "paradox" of Banach-Tarski (Dara O Shayda drew attention to this), when the decay of a single set is possible for at least 5 separate parts, that is, the separation of only 3 individual quarks from the proton is impossible. Using set theory, we can continue to consider the properties of the axion (quarkilino) and its position in set theory, for example, in the Zermelo — Fraenkel set theory ZF system.
ZF is an open octonion Table 3, including: 1. Axiom of extensionality AE, 2. Axiom of Union AU, 3. Axiom of existence of Boolean AB, 4. Axiom Scheme of specification ASs, 5. Axiom of Infinity AI, 6. Axiom Scheme of replacement ASr, 7. Axiom of Regularity AR. To complete the axiomatization, enter in ZFC 8. Axiom of Choice AC is the Axiom of the Actor.

Table 3: Octonion of the axiom system ZFC, supplemented by the Axiom of Choice AC.

	AE	**AC**	
AR			AU
ASr			AB
	AI	ASs	

In turn, the system of axioms of Choice/Determinacy that includes: 1. Axiom of Determinacy AD, 2. Axiom of Choice AC, 3. Axiom of Determinacy+ AD+, 4. Axiom of Dependent Choice DC, 5. Axiom of real Determinacy ADr, 6. Axiom of countable Choice or Axiom of denumerable Choice ACω, 7. Axiom of Projective Determinacy PD, for the closure of the octonion should be supplemented with the appropriate Actor, 8. Axiom of entanglement Choice ACe is shown in Table 4.

Table 4: Octonion of the axiom system of Choice/Determinacy, supplemented by the Axiom of entanglement Choice ACe

	AC	ACe	
AD			DC
PD			AD+
	ACw	ADr	

.

The stratagem (στρατήγημα, 計) of the Axiom of entanglement Choice ACe is shown in the diagram Figure 6, made on the basis of the well-known figure.[1]

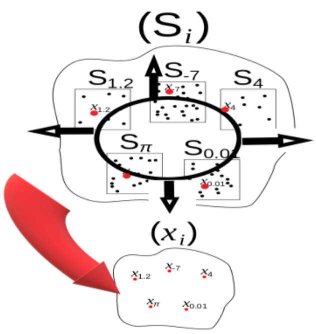

Figure 6 : Axiom of the Actor ACe

[1] Source: https://ru.wikipedia.org/wiki/Аксиома_выбора (accessed July 2022).

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The wave front (black with arrows), a Shayda-Maxwell superluminal robot, expands and continuously entangles elements of S_n sets, sequentially forming x_n sets. There are infinitely many sets of S_n, infinitely many elements in them, and infinitely many elements are selected simultaneously in the set X_i, but the selection time is zero, that is, instantaneous selection is performed.
Octonion or combinations with quaternions of axioms with various Actors that provide or exclude the presence of paradoxes also organize other axiomatic systems, such as Neumann-Bernays-Goedel axiom system NBG with special cases and variants; Tarski-Grothendieck set theory; Kripke-Platek axioms of set theory KP; axiom system of probability theory Kolmogorov; systems of axioms of Euclid, Lobachevsky, Riemann; Hilbert; Alexandrov; Birgof; Tarski. The Smarandache Hypothesis [9] octonion also includes the Actor $v=\infty$, $w=\infty$, which allows us to consider this position as an Axiom of Smarandache.
The ZFC, NBG, MK systems have a model/universe that includes an inaccessible cardinal number k, to which we can direct the information transfer rate $v \rightarrow k$ in the ACe - axiom of confused choice, not to infinity with the speed $v \rightarrow \infty$, this is a *transcendent* tachyon according to Peter Putenikhin [19], but to k, that is, to introduce the concept of a *cardinal* tachyon.
The duality of the obvious premises of the axioms AC and AD and the non-obvious conclusion - confinement, allows us to give the Axiom of Choice the mathematical nature of the appearance of mass particles that can be divided into "parts", and the Axiom of Determinacy to transfer responsibility for mass-less indivisible particles, and describe this phenomenon as a mathematical basis for physical spontaneous symmetry breaking. The inequality of the Actors AC and AD in relation to ZF and to each other [20] suggests rather that the octonion of both axiomatic systems and the octonion of quanta is not perfect or symmetrical.
From the point of view of physics, we are dealing with a situation where the spin field has a conformal weight of 5/8, and the Faddeev-Popov spirits are a field with a conformal weight of 3/8, while their product is a fermion vertex with a weight of 1 [21]. In the octonion of quanta, we have 8 particles - 4 fermions and 4 bosons, but the birth of the axion boson from fermions — quarkilino changes the ratio to 5/8 and 3/8 and 3 fermions and 5 bosons are observed, while the surface of the wave front and fermion and boson fields has the superluminal properties of spirits-tachyon.
As a digression, let us remember that reality is not just "given" in experience, it is, according to Gustav Speth, "riddled" (mystery, enigma, secret), and the discovery of its meaning is achieved through the disclosure of intuitive acts of the human mind [22]. Apparently the world of Plato is not a World of Ideas that can be opened, but a World of Riddles that need to be solved, attracting an Actor who uses 5 "loaves" and 2 "fish," becoming the third "fish," builds an intuitionistic predicate calculus. 12 intuitionistic schemes of axioms and rules 3, supplemented with 1 axiom-actor, for example, immediacy achieve the elusive cardinal in the form sedenion/sedeon or dual bioctonions, or tetraquaternion, or group of E8 allow without any paradoxes to describe the physics of the missing law of the excluded middle. We can, taking into account the interpretation [23] of the Löwenheim-Skolem theorem on non-isomorphic interpretations of the language of mathematics and the analysis [24] of the pool of physical interpretations of quantum mechanics, talk about at least 4 mathematicians and 4 physicists, 8 sections of gnoseology/epistemology and 16 philosophies, and praise the generosity of the Pythagorean harmony.
Let's continue the systematization of super-string theory by quadrants based on [25], [26] and [27] Table 5.

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5D USp(2n)

6D (2,0) SCTP

AdS7 × S4

SG 10+1

E- heterotic theory E_8 x E_8

B 10+1(16) < E F 10 > E

IIB - theory B 10+1 < B B 10+1 < A IIA - theory

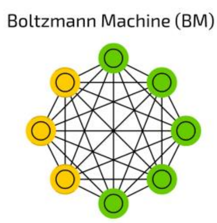
F 10 > B F 10 > A

B 10+1(16) < O F 10 > O

O - heterotic theory / I - theory
SO(32)

Table 5. Octonion string interpretations.

Upper quadrant:
4D Superluminal field theory with gravity with superluminal total entanglement;
5 USp(2n) - 5-dimensional field theory after compactification of S1 6D (2,0) SCTP by one of the dimensions with non-zero 5-dimensional angles;
6D (2,0) SCTP - 6-dimensional superconformal field theory;
AdS 7xS4 -11(7+4) - dimensional correspondence of the "anti-deSitter" space and the space of conformal field theory;
"SG 10+1" - 11-dimensional super-gravity;
"E - heterotic theory" for closed strings;
"B 10+1 (16) < E" or "B 26 < E" is the boson part of the e - heterotic theory with counterclockwise vibrational modes in 26 dimensions;
"F 10 > E" - the fermionic part of the e - heterotic theory with clockwise vibrational modes in 10 dimensions;
Lower quadrant:
Combined "O - heterotic theory / I - theory" for open and closed strings;
"B 10+1 (16) < O" or "B 26 < O" is the boson part of the O - heterotic theory with counterclockwise vibrational modes in 26 dimensions;
""F10 > O" - the fermionic part of the o - heterotic theory with clockwise vibrational modes in 10 dimensions;
Right and left quadrants:
Boson and fermionic parts of the IIA and IIB theories, respectively.
The choice of the octonion representation for the M-complex SG 10+1, which includes 5 string theories I, IIa, IIb, HO, HE and 3 self-dual components of the boson string theory, allows us to outline an epistemological sequence for the theories AdS7×S4, 6D (2,0) SCTP, 5D USp(2n) with the construction of a 4D Superluminal field theory with gravity with superluminal total entanglement.
The octonion of quanta/strings, as a neural network, begins with a Markov Chain (MC or discrete time Markov Chains, DTMC), trying to answer the question — what is the probability of a quantum moving to the boson position while in the fermion state [28]? The subsequent " training" of quanta occurs in the Hopfield neural network (HN), when each quantum has its own "activation temperature", during which the quantum takes one of two fermion/boson values; for specific quanta values, "masses" are calculated, which do not change in the future; thanks to associative memory, the octonion, receiving half-noisy information about the boson/fermion ratio, restores it to full. The complete design philosophy, according to which space-time is a neural network [29], takes the form of (Figure 7) a Deep 3/5 Boltzmann Machine DBM for training quanta to match AdS/CFT



correspondence.

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Figure 7 : 3/5 Boltzmann Machine

In this case, the end of space, the "solid wall" where the field should disappear is determined by the condition for mass $c(zN) = \infty$ or the direction of space z should be extended to $z = \infty$ and AdS/CFT matching requires Infinitely Deep Boltzmann Machines. The transcendental or cardinal tachyon allows you to perform "training" of quanta, and, consequently, completely entanglement the entire Universe, instantly, without restrictions on mass and space, formulating a 4D Superluminal field theory with gravity with superluminal total entanglement of quanta.

6. Conclusion

So spent speculative explanation on the fingers allows to characterize the axions as quite realistic and quanta of the Standard Model, and potentially created theories and the totality of their interpretations; their properties are not beyond the limits of observation and experimentation with their participation at the existing level of energies and time; but requires because of its scalar nature use not detector field strength and detectors scalar and/or vector potentials.
For this purpose, the already used well-known experimental efforts to register the action of the field potential, specifically, scalar / vector potential detectors based on the *Aharonov-Bohm effect*[2] or on the basis of the Wolf-Bragg condition for x-ray diffraction/interference [30], [31].
The creation of axion telescopes with matrices of nano - or micron-sized pixels, for example, [32], [33], [34], [35] for the observation of space Rφ and RA will allow establishing superluminal Contact of Civilizations.

«And into space drunk cutting a chisel …
… heart beats, Lord, hearts»
Yunna Moritz

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References

[1] Vervoort, Louis. Probability Theory as a Physical Theory Points to Superdeterminism, *Entropy* 21(9) : 848, August 2019, DOI: 10.3390/e21090848
[2] Ilin, Alexander B. Contact with extraterrestrial civilizations performs the superluminal Shayda-Maxwellian robot performs cross linking The Light of Other Days in the form of metamorphosis the megascopic active medium. *Unpublished report*. May 02, 2016
[3] Ильин А.Б. Сигнал прерывания Великого Молчания. Квантовая Магия, том 10, вып. 1, стр. 1153-1160 2013; also [3a] Alexander Ilin. Interrupt signal Great Silence. http://www.quantmagic.narod.ru (accessed Aug. 2022)
[4] PLANCK Collaboration. Planck 2018 results. VII. Isotropy and statistics of the CMB. *arXiv:*1906.02552, 2019.
[5] Betz, M., F. Caspers, M. Gasior, M. Thumm, & S. W. Rieger. First results of the CERN Resonant WISP Search (CROWS). *arXiv:*1310.8098v1 [physics.ins-det], 30 Oct 2013.
[6] Smarandache, Florentin. *A unifying field in logic: neutrosophic logic. Neutrosophy, neutrosophic set, neutrosophic probability*. 3rd ed. (Preface by C. T. Le), American Research Press, Rehoboth, 2003.
[7] Christianto, Victor, & Boyd, Robert N., Remark on Recent Experimental Findings supporting Smarandache's Quantum Sorites Paradoxes, Superluminal Hypothesis, and SubQuantum Kinetic Model of Electron, *Journal of Cosmology, Filaments and Astrobiology*, Vol. 1, No. 1, pp. 08-15, 2022, DOI: https://doi.org/10.54216/JCFA.010101

[2] Editorial note: Actually, this rather speculative presentation of possibility of superluminal interaction such as Aharonov-Bohm effect can be explained differently without any recourse of exotic (bosonic) string theories or tachyons, for instance to mention a few alternatives: with topological electrodynamics theory developed by Barrett, or by reconsidering superfluid experimental results, cf. Tapio Simula et al. (2022). Nonetheless, this article is published here because it passes review process and secondly, in order to allow scientific dialogue over various standpoints to describe superluminal interaction and superluminal communication. (JCFA)

Doi : https://doi.org/10.54216/JCFA.010205
Received: March 13, 2022 Accepted: August 11, 2022

[8] Smarandache, Florentin. *Life at Infinite Speed*. Arizona State University, Hayden Library, Special Collections, Tempe, USA, 1972.
[9] Smarandache, Florentin There Is No Speed Barrier in the Universe and One Can Construct any Speed. *Bull. Pure Appl. Sci.,* Delhi, India 17D, 61, 1998. http://www.gallup.unm.edu/~smarandache/NoSpLim.htm. (accessed Aug. 2022)
[10] Weisstein, Eric W. https://scienceworld.wolfram.com/physics/SmarandacheHypothesis.html (accessed Aug. 2022)
[11] Kuz'menko D.S., Simonov Yu.A., & Shevchenko V.I. Vacuum, confinement, and QCD strings in the vacuum correlator method. *Phys. Usp.* 47, 1–15, 2004, DOI: 10.1070/PU2004v047n01ABEH001696
[12] Рубаков В.А., Тиняков П.Г., V.A. Rubakov, & P.G. Tinyakov Модификация гравитации на больших расстояниях и массивный гравитон. Infrared-modified gravities and massive gravitons. Успехи физических наук. Август 2008, Том 178, № 8, с. 785-822. *Uspekhi Fizicheskikh Nauk* 178(8), 85 - 822, 2008, DOI: 10.3367/UFNr.0178.200808a.0785
[13] Миронов В. Л., Миронов С. В. Пространственно - временные седеоны и их применение в релятивистской квантовой механике и теории поля. Институт физики микроструктур РАН, Нижний Новгород, 2014, 129 с. http://ipmras.ru/~Mironov/Publications/SEDEONS.pdf (accessed Aug. 2022)
[14] Davoudiasl, Hooman. Dark matter repulsion could thwart direct detection. *Phys. Rev. D* 96, 095019 – 20 November 2017, DOI: https://doi.org/10.1103/PhysRevD.96.095019
[15] Farnes, J.S.. A unifying theory of dark energy and dark matter: Negative masses and matter creation within a modified ΛCDM framework. arXiv:1712.07962v2, 26 Oct. 2018, DOI https://doi.org/10.1051/0004-6361/201832898
[16] Б. Понтекорво. Нейтринные эксперименты и вопрос о сохранении лептонного заряда. ЖЭТФ, 1967, т. 53, вып. 5, с. 1717-1725.
[17] А.В. Журухина. Аксионы. Эксперименты по их регистрации. Сборник материалов. Под ред. Б. С. Ишханова, О. В. Кечкина, М. Е. Степанова. Свидетельства существования темной материи. Темная материя. М.: Университетская книга, 2014 г. с. 136–147. http://nuclphys.sinp.msu.ru/bm/bm11.htm (accessed Aug. 2022)
[18] Amsler, C. (University of Z¨urich), T. DeGrand (University of Colorado, Boulder), and B. Krusche (University of Basel), http://pdg.lbl.gov/2013/reviews/rpp2012-rev-quark-model.pdf, Revised Aug. 2011 (accessed Aug. 2022)
[19] Дополнения к статье "Трансцендентный тахион" в сборнике статей XXXVIII международной научной конференции "ТЕХНОКОНГРЕСС" Издательского дома "Плутон", 11 февраля 2019 года, с.26-44, URL: https://t-nauka.ru/wp-content/uploads/k38.pdf, http://samlib.ru/p/putenihin_p_w/izo-dop.shtml (accessed Aug. 2022)
[20] Ященко И.В. Парадоксы теории множеств. Серия: «Библиотека "Математическое просвещение"». М.: МЦНМО, 2002. —40с. :ил https://forany.xyz/ax/d1/1/a344/Yashenko_I_V_Paradoksi_teorii_mnojestv.pdf (accessed Aug. 2022)
[21] Каку М. Введение в теорию суперструн: Пер. с англ.- М.: Мир, 1999. - 624 с.164
[22] А. А. Митюшин Большая советская энциклопедия, 1969 — 1978 гг, в 30 томах. https://runivers.ru/philosophy/lib/authors/author64140/ (accessed Aug. 2022)
[23] Клайн М. Математика. Утрата определённости. М.: Мир, с. 316-317, 1984.
[24] Charles Baily Perspectives in Quantum Physics: Epistemological, Ontological and Pedagogical. An investigation into student and expert perspectives on the physical interpretation of quantum mechanics, with implications for modern physics instruction. ArXiv:1109.1295, 2011.
[25] Грин Брайан. Элегантная Вселенная. Суперструны, скрытые размерности и поиски окончательной теории. Издательство ЛКИ Москва, с. 259-260, 2008.
[26] Казаков Д.И. Суперструны, или за пределами стандартных представлений. Успехи физических наук. г. Декабрь Том 150, вып. 4 с. 561-575. 1986
[27] https://nplus1.ru/material/2019/12/22/simple-math (accessed Aug. 2022)
[28] https://tproger.ru/translations/neural-network-zoo-1/ (accessed Aug. 2022)
[29] Hashimoto, Koji. AdS/CFT as a deep Boltzmann machine. *Phys. Rev. D.*, arXiv:1903.04951 [hep-th] (or arXiv:1903.04951v1, DOI: 10.1103/PhysRevD.99.106017
[30] Верин О.Г. Неизвестное электромагнитное поле и направления приоритетных исследований. https://textarchive.ru/c-1856980.html (accessed Aug. 2022)
[31] Terning, John & Christopher B. Verhaaren. Detecting Dark Matter with Aharonov-Bohm. arXiv:1906.00014v1 [hep-ph], 31 May 2019
[32] Rollbuhler, Jorg, Arkadi A. Odintsov. Aharonov-Bohm effect in circular carbon nanotubes. arXiv:cond-mat/9906267 cond-mat.mes-hall, DOI: 10.1016/S0921-4526(99)01774-3

Doi : https://doi.org/10.54216/JCFA.010205
Received: March 13, 2022 Accepted: August 11, 2022

[33] Tonomura, Akira. The Aharonov-Bohm effect and its applications to electron phase microscopy. *Proc Jpn Acad Ser B Phys Biol Sci.* 2006 Apr; 82(2): 45–58.
[34] Webb, R.A.. Washburn S. Квантовоинтерференционные флуктуации в разупорядоченных металлах // Физика за рубежом 1990. Сер. А: Сб. статей / Пер. с англ., франц. - М.: Мир, 184 с., 1990.
[35] Nowak, M. P. & P. Wojcik Probing Andreev reflection reach in semiconductor-superconductor hybrids by Aharonov-Bohm effect. arXiv:1809.11111v2 [cond-mat.mes-hall], Jan 2019

Doi : https://doi.org/10.54216/JCFA.010205
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