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SUSY Perceptions Reveal Standard Model Contradictions: Gravity Absence, Hierarchy Problem, Antimatter Puzzle, Muon g-2 Results, Anti-Down Quark Domination

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ABSTRACT

The road map in this research proves that the universe emerged from SUSY. Proving that, we link between two different classes of SM, fermions, and bosons in supersymmetry with their properties in the Standard Model of particle physics. According to SM properties, the bosons have spin one, while fermions have spin 1/2.

We suggest differentiating between bosons and fermions angular momentum in our real world with a supersymmetrical state. We presume that bosons and fermions in their supersymmetric environment will have akin graviton spin angular momentum 2, while their superpartners will have spin one. In addition to that, in the supersymmetric environment, the fermion, boson, and their counterparts experience CPT conservation. They enjoy eternity with "Gravitons."

Once upon a time, the boson and fermion descended from a supersymmetric state down through string theories' dimensions and M-theory's branes, stabilizing and forming SM quarks and, therefore, everything in our real world.

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Inflation and the Big Bang

This study is concerned with the Standard Model of particle physics. Far from discussing the early universe history, we see in inflation, the Big Bang, flatness problems, horizon problems, and arrow of time important functions in our journey.

The Primary Journey of both Quarks and Anti-quarks Based on SUSY properties and CPT violation

The early hot homogenous universe hosted symmetry broken boson and fermion. Boson and Fermion, both accompanied by their counter partner, and each inherited, from its supersymmetric background, spin angular momentum and congenital energy. Tab. 1 shows the new configuration of boson, fermion, and their counter partners after missing chirality.

Table 1: The new configuration of boson, fermion, and their counter partners after missing chirality

Codes according to the study	Supersymmetric Particles And Entities
$2B\uparrow\downarrow$	Super (Basic) Boson
$1F\downarrow\uparrow$	Supersymmetric bosonic partner: fermion, half spin, opposite direction
$\overline{2F}\uparrow\downarrow$	Super (Basic) Fermion
$\overline{1B}\downarrow\uparrow$	Supersymmetric fermionic partner: boson, half spin, opposite direction

Over and done descending from a supersymmetric state, the whole chirality and electric charge neutrality of both the boson and its fermionic partner and the fermion and its bosonic partner were broken. Later each of the components mentioned above chose to couple with one of the broken positive or negative charges. The super (Basic) boson and super (Basic) fermion picked positive charges leaving negative charges to their attended counter partners. Coupling with electric charges inherited angular momentums, and energy, the boson and fermion became "Quarks" (Tab. 2)

Table 2: Boson and fermion of SUSY became quarks

$2\ F_B$ Fermionian State		$2\ B_F$ Bosonnian State	
$\overline{2\uparrow}\downarrow Q$ Positive Electric Charge	$\overline{1\downarrow}Q$ Negative Electric Charge	$1\downarrow Q$ Negative Electric Charge	$2\uparrow\downarrow Q$ Positive Electric Charge

In our suggestion, color charges are codes leading SM particles to appropriate dimension and brane, where they can be stable. Three colors or codes (One Odderon) mean three stable points, which should be any surface in our universe, i.e., D-2 of M-theory. Four colors, codes might shape any geometrical volume in space, and so on. Eight gluons might show eight-color charge "codes" specified to another dimension. Anti-color of anti-quarks still to be probed deeply based on this study. (Tab. 3)

Table 3: Anti-color of anti-quarks still to be studied more deeply based on this study

2 F_B Super (Basic) Fermionian State + anti-color charges		2 B_F Super (Basic) Bosnian State + color charges		Agreeing Electric Charge	M-theory String Theories
2$\overline{\uparrow\downarrow}$Q	1$\overline{\downarrow}$Q	1↓Q color charges Negative Electric Charge	2↓Q color charges Positive Electric Charge		
$\overline{2\ b}$ Anti-color charges Positive Electric Charge τ +	$\overline{t}$ Anti-color charges Negative Electric Charge τ -	b color charges Negative Electric Charge τ -	2 t color charges Positive Electric Charge τ +	τ^+ τ^-	D- 2+n_2 Third Generation
$\overline{2\ s}$ Anti-color charges Positive Electric Charge μ+	$\overline{c}$ Anti-color charges Negative Electric Charge μ-	s color charges Negative Electric Charge μ -	2 c color charges Positive Electric Charge μ +	μ^+ μ^-	D -2+n_1 First Generation
$\overline{2\ d}$ Anti-color charges Positive Electric Charge e^+	$\overline{u}$ Anti-color charges Negative Electric Charge e+	d Three color charges Negative Electric Charge e-	2 u Three color charges Positive Electric Charge e+	e^+ e^-	D – 2 Ads/CFT First Generation

Hierarchy Embed in the Standard Model

If we consider the energies of the quarks' generations, the hierarchy problem will be solved through Standard Model quarks' generations. Hierarchy is associated with a gradual decline of SM quark's generations, rendering with the dimensions of string theory and membranes of M-theory. (Tab. 4)

Table 4: hierarchy problem solving

Generations of Standard Model Quarks	Quarks	Hierarchy of Standard Model
	Inflation and Big Bang	~ 10^{28} eV
t , 2 b , τ^{+-}	Third Generation	~ 10^{11}-10^{9} eV
s , 2c , μ^{+-}	Second Generation	~ 10^{9} eV
d , 2u , e^{+-}	First Generation	~ 10^{6}-10^{5} eV

Gravity is all in the Standard Model

In particle physics, the electroweak interaction or electroweak force is the unified description of two of the four known fundamental interactions of nature: electromagnetism and weak interaction. In this study, we will leave force to classical physics and keep on working with quantum levels. Replacing bosons' forces mediators with gravity, charges, and energies, we tell their role in subatomic interactions. Gluons of strong force are oscillating gravity that shared confinement with quarks in the early universe hot plasma. A gravitational field is responsible for electromagnetism. Gravitons are closed strings of string theory and supergravity of superstrings. All massless bosons in the current SM emerged out of gravity.

Force mediators in our subatomic model come agreeing their causes in three categories:

1. Gravity: Field (Universal, GR), photons1 (Electromagnetism, Gravitational waves that convert into radio waves), gluons (Oscillating confined early gravity in hot plasma), gravitons (Closed strings of ST), and Supergravity (Superstrings).
2. Energy: Photon2 (Neutral ordinary matter broken charge to e^{+-}) ,and "Z" boson (Neutral dark matter broken charge to W^{+-})
3. Charges: Ordinary matter quarks' charges positive or negative (τ^{+-}, μ^{+-}, e^{+-}). Dark Matter's positive, or negative charges.(W^+, W^-)

Feynman diagrams support our mediators' classifications.

We differentiate between the two photons; they are assigned to different resources (Gravity, or neutral electric charge).We consider neutrinos dark matter elementary particles, and W^{+-} its charges (DM will be judged in another related study latter.)

Standard Model Quarks "u" and "d" Prove Ads/CFT

We will focus on the first generation (our universe), which we and everything in our life is made of.

Naively and simply, I probed into the flaccid triangles' back and forth colored movements, in both the proton and neutron of any atom. Back to triangle rules, we learned at school: middle angle and two sides or one side and two angles can identify any triangle and so any specific surface. If we have a two-dimensional vector, we can use trigonometry to resolve the vector into its components in the x and y directions. Therefore, the charged three colors with their u or d quarks and colored gluons will represent surface rules.

The proton and neutron of any baryon are linked to our universe in its D-2 surface or brane. The "s" quark goes to volume. Quarks' and hadrons' configurations with the suggested above-mentioned gravity mediators pave the way to embed Ads/CFT in the Standard Model of particle physics (Tab.3).

Color Fractional Charges, Replace Electric Charge Slices

We will focus on the first generation, which we and everything in our life experience.

Charge breaking enabled electric charges leptons to be present in the gluon quark plasma. The "u" quark presenting super boson (not partner) gets a positron e^+ leaving the electron e^- to its partner fermion d. On the other hand, "d" as a super fermion (anti-down quark d in SM) having intrinsic angular momentum two, catches the positron e^+, leaving the electron e^- to its counter partner anti-quark "u." Both $\bar{u}$ and anti d of SM inherited angular momentum equal to two and coupled with e^+. The d of SM (down quark) and anti u inherited angular momentum equal to one and coupled with e^- (Tab. 3).

The "u" and "d" quarks in proton and neutron experience at the same time three different colors, and they share the white color, named "Odderon," equally. The "u" case is now equal to $2/3e^+$. The "d" case is equal to $1/3e^-$. This might be how the fractions: 2/3 and 1/3 come to u and d. Fraction 1/3 is related to the color charge ratio and not the electric charge because "Odderon" appears at different rates in proton-proton collisions and proton-antiproton collisions. (Tab. 5) shows how the fraction of 1/3 comes to quarks.

Table 5: The fraction of 1/3 comes to quarks from color charge "Odderon"

2F	1B	1F	2B
2d (G,R,B)e^+	**1u(G,R,B)e^-**	**1d(G,R,B)e^-**	**2u(G,R,B) e^+**
$2\bar{d}e^+$ W_G /3	$1\bar{u}e^-$ W_G /3	$1de^-$ W_G /3	$2ue^+$ W_G /3
$2\bar{d}e^+$ W_R /3	$1\bar{u}e^-$ W_R /3	$1de^-$ W_R /3	$2ue^+$ W_R /3
$2\bar{d}e^+$ W_B /3	$1\bar{u}e^-$ W_B /3	$1de^-$ W_B /3	$2ue^+$ W_B /3
Green = White (Odderon)/3, Red = White (Odderon)/3, Blue = White (Odderon)/3			

"Muon g-2 Results", Support the Relation between Standard Model and M-theory

In Standard Model theoretical calculations, particles (quarks and Leptons) are treated as if they existed in one D-dimension - ours. Experiments (Fermilab and Brookhaven National Laboratory) see them as they are in reality, in different dimensions, which also means different energy levels.

Neutrinos show the same spinning axis or gyroscope as a muon in a Muon g-2 experiment. Their similar behavior of D-dimension existence will support our suggestion (Tab. 6).

Table 6: Standard Model charged particles according to String Theory

String Theories& M- Branes	Approx. Energy Level	Quarks	Quarks	Electric Charges	Neutrino	Stable Ordinary Matter Akin Branes of M-theory
D-2+n_2	~ 10^{11}-10^9 eV	**2top**	**bottom**	**Tau +, -**	**Tau Neutrino**	**Stable Uncomprehend Matter on Another Higher Brane**
D-2 +n_1	~ 10^9 eV	**2charm**	**strange**	**Muon +, -**	**Muon Neutrino**	**Stable Uncomprehend Matter on Higher Brane**
D-2	~ 10^6-10^5 eV	**2up**	**down**	**Electron Positron**	**Electron Neutrino**	**Stable Ordinary Matter in our D- 2 Universe**

Why Anti-down Quark Screw Anti-up Quark. Proton Asymmetry Puzzle

A discrepancy was already noticed in the experiments at CERN to determine that there are always more anti-down quarks in the proton than anti-up quarks, no matter what the quarks' momentums are. Our study proves that there are no exceptions to the SM rules. Quark momentum should play a role in the anti-down quark excess. Conferring this study, the angular momentum of the anti-down quark is twice as big as the angular momentum of the anti-up quark (Tab. 7).

Table 7: "$\bar{d}$" anti-down quark inherited twice more angular momentum than its counter partner "$\bar{u}$."

SUSY CPT	Super (Basic) fermion 2 F	Super (Basic) fermion's boson 1B	Super (Basic) boson's fermion 1 F	Super (Basic) boson 2 B
	$2\bar{Q}$ $2(\overline{b,s,d})$	1 anti $\bar{Q}$ $1(\overline{t,c,u})$	1 anti $\bar{Q}$ (b,s,d)	2 Q 2(t,c,u)
Electric Charges	τ+ ,μ+ ,e+	τ- ,μ- , e-	τ- ,μ- ,e-	τ+ ,μ+, e+
Third Generation	$2\ \bar{b}\ \tau^+$	$1\ \bar{t}\ \tau^-$	$1\ b\ \tau^-$	$2\ t\ \tau^+$
Second Generation	$2\ \bar{s}\ \mu^+$	$1\ \bar{c}\ \mu^-$	$1\ s\ \mu^-$	$2\ c\ \mu^+$
First Generation	$2\ \bar{d}$ e+	$1\ \bar{u}\ e^-$	$1\ d\ e^-$	$2\ u\ e^+$

Antimatter and Matter Split and do not Meet

When we consider, according to SUSY, the origin of SM quarks' families, the fermion of any generation, here" $\bar{d}$" anti-down quark of the first generation will not give up and let its counterparts " $\bar{u}$ "domain, simply because "$\bar{d}$" anti-down quark inherited twice more angular momentum than its counter partner "$\bar{u}$." Our new suggested Standard Model modification shows that anti-proton will be neutral, while antineutron will be positive. Atoms' nucleus of matter and atoms' nucleus of antimatter will repel, split, and never meet. Our anti-matter could be hiding somewhere in the universe!

Conclusion

when every generation of the Standard Model's quarks come into existence with their allocated charges, they will repel their anti-quarks. Matter and antimatter will split, not annihilate. (Tab. 8) illustrates the new matter anti-matter scene [1-8].

Table 8: Both the nucleus of Matter and Antimatter are positively charged, keeping them away from each other

	Antimatter Originally (SUSY Fermionic State)			Matter Originally (SUSY Fermionic State)	
Any Generation	Proton 0	Neutron **+1**	⟺	Neutron 0	Proton **+1**
Nucleus Electric Charge	+ 1			+ 1	

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