

Detailed quantum hyperbit requirements to support the "simulation hypothesis" of the universe

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Abstract



My Source Science model of the universe proposes that the entire universe of matter, energy, space, time, and quantum states can be constructed using pure hyperbits, represented as orthonormal bit-vectors. This topological spacelike protophysical bit-cloud has all the requirements for a bit-vector/n-vector simulation core, including bits, quantum states, qubits, ebits, bosons, leptons, quarks, space and time, plus our proposed Higgs Boson, dark energy and dark matter. Also supports mind/meaning/rotes as thought vectors using LOA math.

This paper will discuss how orthonormal spacelike hyperbit-vectors is the key to supporting concurrency in this entangled simulation bit-cloud infrastructure, since spacelike proto-bits are more primitive than energy or matter, space or time.

About Quantum Doug Matzke









- o My moniker is Quantum Doug
- Programming for over 50 years
- Chairman of PhysComp '92 and PhysComp '94
 - ANPA Session in PC'94
- Written over 40 papers/talks and 10 patents
 - Will Physical Scalability Sabotage Perf. Gains?
- PhD in Quantum Computing in 2002 at UT Dallas
 - Quantum Computing using Geometric Algebra
 - Built GALG symbolic math tool in python
 - GALG research for last 20 years (w/Mike Manthey)
- Awarded \$1 million SBIR grants on topics:
 - Neural and quantum computing
- Certified master practitioner in Neuro-Linguistics-Programming (NLP)
- Deep Reality book coauthored by William A. Tiller (deceased)
 - Source Science and bit-physics
- Cofounded Coherent Spaces with WISH products
 - See www.CoherentSpaces.Life

What is below classical and quantum?



HyperBit Cloud Requirements



The infinite protophysics simulation core must be informational (bits) and hyperdimensional (massively orthonormal) and can NOT presuppose spacetime, fields, energy, nor matter exists. Must support spacelike coupled quantum states to support quantum concurrency, quantum states, qubits (superposition) and non-locality of pervasive ebits (entanglement). This non-metric bit cloud is more primitive than and leads to (it from bit) the emergence of the metric space of our typical spacetime 3D+1T relativistic space. Infrastructure supports non-computational simulation state space.



Co-occurrence means states

exist simultaneously/concurrent: proto-**Space-like** via "+" operator

 Co-exclusion means a change
 occurred due to an operator: proto-Time-like via "*" operator



Abstract Time

Hyperbit Reality vs Simulation



Where is the "computational infrastructure" and software for all examples?

Weakness/Limits Topics	Simulation Domain (where is the accurate software)
Inaccurate results	Weather forecasting due to escalating diverging probabilities
Three Body Problem	Small uncertainties in initial conditions
Models are unknown	Unclear Modeling of reactions in any domain
Elementary particles	Behavior of elementary particles (software for leptons/quarks/bosons/EM?)
Probabilistic Models	Quantum Computation, no cloning & measurement
States vs operators	Must be same representation for states and operators (Von Neuman)
Computer doesn't melt	Modeling any nuclear reaction (bomb, sun, blackhole,)
Exponential algorithm growth	Quantum Polynomial Time for Shor's algorithm (Quantum Supremacy)
Precision limits/grid size	128-bit Precision of complex numbers & exponential state growth
Limits to parallelism	Protoparallelism due to protospace and prototime and protoOS infrastructure
Meaning	No accepted model of meaning for the mind & telepathy
No General Intelligence	AI LLM simulates hyperdimensional space vs mind's Real Intelligence (RI)
Spacetime model nonlocality restrictions	Metaphysics models, such as lucid dreaming, remote viewing, OBEs, PK
Local realism is false (bell's theorem)	Somehow must integrate quantum and relativity at Planck scale
Representation & Scalability	Scales exponentially in space, time, events, energy & OS events
Simulation speed	Any simulation that runs slower than "real time"
Quantum Coupling/entanglement	Exponential spacelike state spaces

Universal hyperbit information cloud must handle everything topologically, without software/OS

Artificial Intelligence vs Real Intelligence

Al uses neural networks and LLMs to **simulate** a hyperdimensional space using weights based on training data. This is like a hologram where all data is distributed into all **discrete** nodes. Adding new learning changes all weights and limited by spacetime.

RI utilizes a **real** hyperdimensional spaces, so similar meanings are naturally near each other in the state space. These quantum states are concurrent giving a "**wholeness**" and unity not possible with AI. Adding new states is incremental since beyond spacetime.



Life would be extinct if not for the efficient ordering capabilities of Real Intelligence



Gentle introduction to source science GALG bit-physics used by quantum computing





Introduction to Graded Spaces - GALG



See operators for qubit and qutrit online in my PhD dissertation



Ebits: Entangled Qubits



 Bell/Magic Operators (in G₄): Bell operator = S_A + S_B = a0 a1 + Magic operator = S_A - S_B = a0 a1 Bell/Magic States B_i and M_i for 	b0 b1 - b0 b1 rm rings:	
$\mathbf{B}_{(i+1)mod4} = \mathbf{B}_{i} (\mathbf{S}_{A} + \mathbf{S}_{B})$	$M_{(i+1)mod4} = M_{i} (S_{A} - S_{B})$	Entangled photon pair
$B_0 = A_0 B_0 Bell = -S_{00} + S_{11} = \Phi^+$	$M_0 = A_0 B_0 Magic = + S_{01} - S_{10}$	$ \Psi\rangle_{12} = \uparrow\rangle_1 \uparrow\rangle_2 + \leftrightarrow\rangle_1 \leftrightarrow\rangle_2$
$B_1 = B_0 Bell = + S_{01} + S_{10} = \Psi^+$	$M_1 = M_0 Magic = -S_{00} - S_{11}$	$\frac{1}{2}$
$B_2 = B_1 Bell = + S_{00} - S_{11} = \Phi^-$	$M_{2} = M_{1}$ Magic = $-S_{01} + S_{10}$	$\Phi^{-} = 00\rangle \pm 11\rangle$
$B_3 = B_2 Bell = -S_{01} - S_{10} = \Psi^-$	$M_{3} = M_{2}$ Magic = + $S_{00} + S_{11}$	$\Psi^{\pm} = 01\rangle \pm 10\rangle$
$B_0 = B_3 Bell = -S_{00} + S_{11} = \Phi^+$	$M_0 = M_3$ Magic = + $S_{01} - S_{10}$	

Cannot factor: – a0 b0 + a1 b1 (Inseparable)

> Bell and Magic operators are irreversible in \mathbb{G}_4 (different than Hilbert spaces)

• See proof that $1/(S_A \pm S_B)$ does not exist for Bell (or Magic) operators

> Multiplicative Cancellation – Information erasure is irreversible

- Qubits A₀ B₀ = + a0 b0 <u>- a0 b1 a1 b0</u> + a1 b1 = <u>B₃ + M₃</u>
- 0 = Bell * Magic = Bell * M_j = Magic * B_i = B_i * M_j

All qubit states are spacelike as foundation for bell/magic states



2^Q Growth for Qubit States Complexity



Qubits: A=a0+a1, B=b0+b1, C=c0+c1, D=d0+d1, E=e0+e1, F=f0+f1, G=g0+g1 **Coupling:** A*B*C *D*E *F*G (equivalent to tensor product)

		+	(a0'	^b0'	^c0)) —	(a0	^b0	^c1)) –	(a0)^b1	^c0)	+	(a0	^b1	^c1)		
		-	(a1	^Ь0'	^c0)	+	(a1	^b0	^c1)) +	(a1	^b1	^c0)	-	(a1	^b1	^c1)		
+	(a0^b0	0^c0	^d0^e0)^f0^o	g0) -	(a0^	b0^c0	^d0^e	0^f0^g	g1) -	(a0^	b0^c0′	'd0^e0'	^f1^g	0) +	(a0^l	b0^c0	^d0^e	0^f1	^g1)
-	(a0^b0	0°c0	^d0^e1	^f0^g	g0) +	(a0^	b0^c0	^d0^e	1^f0^g	g1) +	(a0^	b0^c0'	`d0^e1'	^f1^g	0) -	(a0^	b0^c0	^d0^e	1^f1	^g1)
_	(a0^b0	0°C0	^d1^e0)^+0^ <u>q</u>	g0) +	(a0^	b0^c0	^dl^e	0^+0^	g1) +	(a0^	b0^c0'	`d1^e0'	^+1^g	0) -	(a0^	b0^c0	^dl^e	0^+1	^g1)
+	(a0^b	0°C0	^d1^e]	L^+0^ <u>0</u>	g0) -	(a0^	60°C0	^dl^e	1^+0^0	g1) -	(a0^	60°C0'	'd1^e1'	^+1^g	0) +	(a0^1	00°C0	^dl^e	1~+1	^g1)
-	(a0^b	9°C1	^d0^e0	0^+0^ <u>0</u>	g⊍) +	(a0^	b0^cl	^d0^e	0^+0^0	g1) +	(a0^	b0^c1'	'd0^e0'	^+1^g	0) -	(a0^1	00°C1	^d0^e	0^+1	~g1)
+	(a0^b	1. CT	°d⊍^el		go) -	(a0"	D0°C1	^d⊍^e	T.+0.0	g_j	(a0^	D0°C1′	.do.eT.	°+1^g	0) + 0) ·	(a0"		^d⊍^e	T.+T.	°gi)
+	(a0"D0	1.CT	^d1^e6		go) -	(a0"	DU"CI	~d1~e	1	gij —	(au^	DU°CI	.dTe∩.	^+1^g	0) + 0)	(a0"		°d⊥~e	1 ^ C 1 /	°gi)
	(a0"De		vqovec atet		g⊎) + ~0) +	(a0"		v90v0 ate		gi) + ~1) +	(a0*		ar.er.	°+⊥~g ∿£1^~	- (U	(a0~)		v40v0 ate	0 v T 1 /	~gi)
-			00 ed ^d@^o1	· τυ <u>υ</u>	40) -	(a0)		a ou 2002	0 TO 0 1^£0^/	JIJ T 31) _	(a0		uo eo 1/	тт у ^£1^а	6) – L	(a0 1		a ob ^d@^o	ע דע 1 ^ ב 1 י	91) ^a1)
+	(a0 D)		دع uo مم11مم	1 + 0 <u>0</u>	- (9g	(a0)		41^a	0~±0~0	עדע – ארוי –	(a0		uo er 12°00'	+⊥ y ^£1^a	6) + 6) +	(a0 1		uo e ^d1^o	፲ ፲ ፲ በላደገ	91) ^a1)
<u> </u>	(a0^b)		dr et 1م^11^	^_@^	40) +	(a0^		ar e م^11^	1^+0^	91) 1) +	(a0^	b1 ^ c0'	eu 1/م^11	^f1^a	0) -	(a0^		ar e م^11^	1^£1	^a1)
+	$(a0^{h})$	^c1	- d0 ^ e0)^£0^0	- (Θr	(a0^	b1^c1	°40∿≏	0^+0^	1) –	(a0^	$b1^{1}c1'$,40ve0,	11 9 11 α	0) +	(a0^l	$h1^{1}$	ore AUD^	0^£1	^a1)
_	(a0^b1	$1^{\circ}c1^{\circ}$	^d0^e1	^+0^	4 (0r	(a0^	b1^c1	^d0^e	1^f0^d	,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(a0^	$b1^{1}c1'$	'd0^e1'	^f1^a	0) -	(a0^	$b1^{c1}$	^d0^e	1^f1	^a1)
_	(a0^b1	^c1	^d1^e@)^f0^d	u0) +	(a0^	b1^c1	^d1^e	0^f0^d	(1) +	(a0^	b1^c1'	`d1^e0'	^f1^a	0) -	(a0^	b1^c1	^d1^e	0^f1	^a1)
+	(a0^b1	^c1	^d1^e1	^f0^d	a0) –	(a0^	b1^c1	^d1^e	1^f0^d	u1) -	(a0^	b1^c1'	`d1^e1'	^f1^a	0) +	(a0^	b1^c1	^d1^e	1^f1	^a1)
_	(a1^b@	0^c0	^d0^e0)^f0^d	a0) +	(a1^	b0^c0	^d0^e	0^f0^d	$(1)^{(1)}$	(a1^	b0^c0'	'd0^e0'	^f1^a	0) -	(a1^	b0^c0	^d0^e	0^f1	^a1)
+	(a1^b@	0^c0	^d0^e1	.^f0^d	- (0p	(a1^	b0^c0	^d0^e	1^f0^d	a1) -	(a1^	b0^c0′	'd0^e1'	^f1^a	0) +	(a1^	b0^c0	^d0^e	1^f1	^q1)
+	(a1^b0	0^c0	^d1^e0	^f0^d	g0) –	(a1^	b0^c0	^d1^e	0^f0^d	g1) -	(a1^	b0^c0′	`d1^e0'	^f1^g	0) +	(a1^	b0^c0	^d1^e	0^f1	^g1)
—	(a1^b0	0^c0	^d1^e1	.^f0^d	g0) +	(a1^	b0^c0	^d1^e	1^f0^o	g1) +	(a1^	b0^c0′	`d1^e1'	^f1^g	0) -	(a1^	b0^c0	^d1^e	1^f1	^g1)
+	(a1^b@	0^c1	^d0^e0)^f0^g	g0) –	(a1^	b0^c1	^d0^e	0^f0^g	g1) –	(a1^	b0^c1′	'd0^e0'	^f1^g	0) +	(a1^	b0^c1	^d0^e	0^f1	^g1)
—	(a1^b0	0^c1	^d0^e1	^f0^g	g0) +	(a1^	b0^c1	^d0^e	1^f0^	g1) +	(a1^	b0^c1′	'd0^e1'	^f1^g	0) –	(a1^	b0^c1	^d0^e	1^f1	^g1)
—	(a1^b@	0^c1	^d1^e0)^f0^g	g0) +	(a1^	b0^c1	^d1^e	0^f0^g	g1) +	(a1^	b0^c1′	'd1^e0'	^f1^g	0) –	(a1^	b0^c1	^d1^e	0^f1	^g1)
+	(a1^b0	0^c1	^d1^e1	l^f0^g	g0) —	(a1^	b0^c1	^d1^e	1^f0^g	g1) –	(a1^	b0^c1′	`d1^e1'	^f1^g	0) +	(a1^	b0^c1	^d1^e	1^f1	^g1)
+	(a1^b1	l^c0	^d0^e0)^f0^g	g0) —	(a1^	b1^c0	^d0^e	0^f0^g	g1) -	(a1^	b1^c0′	'd0^e0'	^f1^g	0) +	(a1^	b1^c0	^d0^e	0^f1	^g1)
-	(a1^b1	L^c0	^d0^e1	_^f0^g	g0) +	(a1^	b1^c0	^d0^e	1^f0^g	g1) +	(a1^	b1^c0′	'd0^e1'	^f1^g	0) –	(a1^	b1^c0	^d0^e	1^f1	^g1)
-	(a1^b1	L^c0	^d1^e0)^f0^g	g0) +	(a1^	b1^c0	^d1^e	0^f0^g	g1) +	(a1^	b1^c0′	`d1^e0'	^f1^g	0) –	(a1^	b1^c0	^d1^e	0^f1	^g1)
+	(a1^b1	L^c0	^d1^e1	.^f0^g	g0) –	(a1^	b1^c0	^d1^e	1^f0^g	g1) -	(a1^	b1^c0′	`d1^e1'	^f1^g	0) +	(a1^	b1^c0	^d1^e	1^f1	^g1)
-	(a1^b1	l^c1	^d0^e0)^f0^g	g0) +	(a1^	b1^c1	^d0^e	0^f0^g	g1) +	(a1^	b1^c1′	'd0^e0'	^f1^g	0) -	(a1^	b1^c1	^d0^e	0^f1	^g1)
+	(a1^b1	l^c1	^d0^e1	.^f0^g	g0) -	(a1^	b1^c1	^d0^e	1^f0^g	g1) -	(a1^	b1^c1′	'd0^e1'	^f1^g	0) +	(a1^	b1^c1	^d0^e	1^f1	^g1)
+	(a1^b1	l^c1	^d1^e0)^f0^g	g0) -	(a1^	b1^c1	^d1^e	0^f0^g	g1) -	(a1^	b1^c1′	`d1^e0'	^f1^g	0) +	(a1^	p1^c1	^d1^e	0^f1	^g1)
-	(a1^b1	l^c1	^d1^e1	.^f0^g	g0) +	(a1^	b1^c1	^d1^e	1^f0^g	g1) +	(a1^	b1^c1′	`d1^e1'	^f1^g	0) –	(a1^	b1^c1	^d1^e	1^f1	^g1)

All quantum states are spacelike to support bell/magic states

Hyperdimensional spaces





bits qubits, neutrinos Standard model entanglement Tauquinions Correlithms



Bit Grades of Primitive "Particles"

UARK

S EPTON

neutrino

neutrino

neutrino

W boson



Non-Standard Topological Model (from Manthey and Matzke - ANPA)



>43 million states 17 particles and 30 bosons

Multivectors: topological virtual particles





For $\mathbf{U}^2 = 1$ (Unitary) and $\mathbf{X}^2 = \mathbf{X}$ (Idempotent) then $\mathbf{X} = -1 \pm \mathbf{U}$ (proof $\mathbf{X}^2 = (-1 \pm \mathbf{U})^2 = \mathbf{X}$)

Spacelike Entanglement Requirements



Spacelike Hyperbit physics supports entanglement

- Ebits are 4D and thus spacelike (non-local in 3D)
- 4D required for entanglement (tauquernions)
- 5D also supports entanglement (tauquinions)
- 3D Space simulated via entangled tauquernions
- Proposed Higgs bosons are entangled
- Dark quarks and Dark Matter are entangled
- Non-metric requirements for >= 4D





Structured Hyperbit Cloud





Hyperbit clusters from topologies

Spacelike and wavelike states



Hyperbit Clouds know how to behave in N-space

- No software/OS: only topology drives all behaviors
- Built-in operating system with max concurrency
- Measure operators are non-invertible/irreversible
- In GALG, all state and operators are multivectors
- In GALG, no complex numbers, so no precision limits
- Entanglement is built-in with hyperbits: can not simulate
- Quantum states are hyperdimensional, not in spacetime
- Quantum states are concurrent, so wavelike
- Quantum states are spacelike to support Bell/Magic
- From hyperbits
 - Non-metric hyperspace with change
 - Wholism is emergent without holograms
 - Spacetime is emergent
 - Quantum Fields are emergent
 - Meaning is emergent
 - Intention/attention due to superposition





Space, time & fields are emergent

Hyperbit-physics introduced so far generates topological based, virtual particles without space, time nor energy-based metrics.

- 3D space from quaternions, tauquernions, tauquinions. No distance metric in N-space, just topology and similarity metric.
- Change exists with maximum concurrency, but currently no time metrics, nor speed of light c
- Future work: 3D+1T Lorentz invariance emerges from H-space, with speed of light c. Also show how virtual particles generate quantum field perturbations
- Future Work: show how Higgs boson even subalgebra slows down virtual particles thereby producing mass





Metric vs Non-metric Spaces



Standard Metric Spaces (relativity & quantum)	Quantum Non-metric Spaces
Bits are physical (Shannon information)	Bit-vectors a , b , c are orthonormal & spacelike (non-Shannon coin demo)
Tensor Product (forms vector space)	Geometric Product increases to bivectors or more.
Hyperdimensional Hilbert spaces (column vectors and matric operators)	Geometric Algebra where all multivectors are both states and operators
Complex coefficients $i = \sqrt{-1}$	Real coefficients, yet non-commutative Spinors since $\mathbf{a}^{\mathbf{b}} = \sqrt{-1}$
Space/distance: x, y, z	Correlation is same as Euclidean distance
Wavelength: depends on space	Describe as vibration since no distance
Time/duration: t (implicit)	Change in state Δ (time is emergent)
Frequency: depends on time units	Describe as vibration since no time
Velocity: units space/time	No hyper velocity since no space & no time
Constant speed of light c and unitarity	Standard Distance $\sqrt{N/6}$ and Standard Radius $\sqrt{N/12}$
Energy/mass	Bits (equivalent energy: Landauer's principle & equivalent mass E=mc**2)
Momentum	Non-metric since relies on velocity and mass
Heisenberg Uncertainty	Non-commutative states such as spinors a^b = - b^a
Space Contraction	None, since no distance (wholeness in NDEs) hyper-dims (not hologram)
Time Dilation	None, since no time (panoramic time in NDEs life review)
Singularity of black hole	Bits on surface area of event horizon (spaghettification) – no inside to BH
Tensor Product (form vector space)	Geometric Product increases to bivectors or more.
Non-locality for entanglement	4 or 5-dimensional spacelike bell/magic states using bell/magic operators
Thought Vectors in AI LLMs (distributed weights)	Points in hyper-dimensional space where len >> 1
Meaning – now real model exists	Rotes as clusters in hyper-dimensional bit cloud where len >> 1

Increasing Hyperbit Cloud State Complexity



Increasing complexity with more dimensions – Infinite intelligence



Space, Time and hyperbit cloud Mind



Transcendent experiences exhibit:

- Hyperbit information centric spacelike virtual simulations
- Maximal 360 spherical concurrent awareness
- Panoramic view of space and time environments
- Non-local information access across space
- Non-local information access across time
- Awareness is a sliding window thru "time"
- Awareness of time as if moving in slow motion (the zone)
- Experience of no time (meditation)
- Maximal concurrency due to spacelike states
- Direct awareness and control of physical reality
- Complete mind control of virtual environments
- Packets of meaning and downloads rotes
- Infinite intelligence and infinite love





Coherent Spaces WISH Units

World Integrity Space Harmonizer (WISH) creates coherence/order and connects you with your higher group consciousness



Simulation Hypothesis Summary



Spacelike, non-metric, topological hyperbit infrastructure as root of hyper-reality

