

Evolution of the Periodic Table as We Know it?

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ABSTRACT

The inversion of the Periodic Table to accommodate spatial variation of atomic energy levels relative to the nucleus has subsequently been underwritten by Quantum Field Theory's $U(1) \times SU(2) \times SU(3)$ group symmetry and Clifford Algebra resulting in a one-to-one mapping between the Roberts-Janet Nuclear Periodic Table and the Quantum Mechanical Table. A coherent sketch of scientific commentary is attempted in the form of two cycles within the Roberts-Janet Table. Mechanisms of superposition, entanglement, tunnelling and decoherence abound but the pathways of causality remain elusive; whether testable as telescopes and artificial intelligence evolve. Mass number is no longer a fundamental property. It appears unique to each supernova explosion as the ratio of isotopes varies in the n th decimal place as radioactivity proceeds. Goodbye a unique Periodic Table. Hello a large number of Periodic Tables underwritten by the Roberts-Janet mechanism where mass number is merely a by-product. The first cycle reignites radioactivity by mergers between neutron stars and black holes - radioactivity having been extinguished temporarily in the ebb and flow of production of white dwarfs, neutron stars and black holes. Nuclei with large mass numbers and low atomic numbers result; rapidly decaying to nuclei with large atomic numbers. By further decay elements familiar to the Periodic Table appear from higher atomic numbers. Various sizes of black hole production suggest a hierarchy of outcomes which not only produce a reignition of radioactivity but potential creations of other universes from explosions of larger and supermassive black holes as the Planck length is approached and energies increase to a scale giving rise to periods of inflation and condensation that predate the production of quarks. This implies universes can be superimposed on previous universes explaining why some supermassive black holes appear in subsequent universes nearer than current theoretical models. The second cycle indicates a path through abiogenesis, water and trace elements to form life ultimately to be extinguished by the Sun's expansion thus merging with the first cycle's production of stars.

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Cycle one

Lower half of the roberts-janet table

High Order Low Entropy Universe

Inflation and Condensation

Hydrogen and Helium form at atomic spatial dimensions

Local gravitation creates stars via plasma and fusion. Heavy elements formed through recycling p , r , s processes and electron capture within nucleosynthesis. Counterintuitively the number of energy states increases as spatial dimensions reduce towards the range of the strong and weak forces.

Vacuum energy fluctuations result in the appearance of second, third generation quarks and multi-quarks together with other fundamental particles. Symmetry breaking, CP violation, Asymptotic Freedom, quark and neutrino mixing, Antimatter.

Formation of White Dwarfs. Gravity and quantum field theory merging. Further electron capture. Formation of neutron stars. Radioactivity extinguished. Quantum information, quantum thermodynamics, role of time.

Black holes form. Entropy minimum recreates high order low entropy environment. Hierarchy of outcomes as mergers of large or supermassive black holes result in creation of new universes superimposed on previous ones as inflation and condensation

predate quark production as Planck length is approached. Explanation for appearance of supermassive black holes in conflict with current theoretical models.

Collisions of neutron stars/black holes. Evaporation of black holes.

Reignition of radioactivity in presence of small atomic number large mass number nuclei.

Rapid radioactive decay. Production of theoretically large atomic number nuclei.

Further decay producing elements within the Periodic Table from higher atomic numbers. Restart of cycle.

Cycle two

Upper half of roberts-janet table

Hydrogen and helium form from initial inflation and condensation of universe. Heavy elements condense within cycle of supernovae explosions. Stars, comets, asteroids and planets form with large numbers of Periodic Tables.

Earths forms; water condenses, organo-catalysis, abiogenesis and climate change initiated. Polar and non-polar carbon compounds formed. Membranes created by two layers of hydrophilic, hydrophobic molecules. Lipids form encapsulation and self-

replication. Combinations of carbon and hydrogen heated with minerals present in early Earth create lipids coupled with prebiotic amino acids present in membrane allowing amino acids to form proteins despite presence of metallic ions in water.

Plausible pathway to create living cells appears over time by incremental steps, Mechanisms of superposition, entanglement, local reversal of entropy, quantum tunnelling and decoherence. RNA and DNA emerge.

Bacteria, microbes, viruses and plants evolve. Organo-catalysis accelerates. Step to live cells via trace elements still elusive. Photosynthesis.

Evolution of Animals, infections, genetic diseases, biochemical pathways, enzymes, amino acids, proteins, gene silencing and editing, vibronic mixing, protein folding, mitosis and meiosis.

New materials and phase transitions discovered. Development of forensic science, drug discovery and delivery. Human manipulation of quantum states in specific compounds, higher temperature super-conductivity.

Collapse and renewal of ecosystems as keystone predators disappear and re-emerge, Plastic and other forms of pollution develop. Change in sea level, global warming, rise of CO(2) and CH(4). Redistribution of ocean heat currents.

Material coalesces. Expansion of Sun absorbs inner planets. Cycle two mergers with cycle one.

Ode to science

With eternal thanks to rudyard kipling

If you can keep your head when all about you Are losing theirs and blaming it on you, If you can trust yourself when all men doubt you But make allowance for their doubting too. If you can wait but not be tired by waiting And yet don't look too good nor talk too wise.

If you can embrace the subtle ways That Nature constantly displays. If you can explore distant galaxies in every detail And analyse their contents as blind men read braille. If you can dream and invert the Periodic Table, If you can think and extend it as far as you are able, If you can put two and two together And place hydrogen and helium by each other.

If you can force fields and energy to serve you And locally reverse time and entropy aplenty. Wilczek's asymptotic freedoms to enjoy. If you can picture how patterns within the table Allow neutrons, protons to intertwine and coalesce All manner of fusion, nucleosynthesis and elements possess To produce Wigner's magic numbers in excess.

If you can explain how radioactive decays Occur by such varied pathways In so many mysterious times and byways. If you can entangle every quantum state Then in an instant allow them to consolidate And all matter known to man create.

If you can meet with gravity and quantum theory And treat those two imposters just the same.

If you can apply mathematics stochastically yet with serendipity To show how Nature develops empirical yet orderly tranquillity.

If you can bear to hear the truth you've spoken Twisted by knaves to trap men's minds and create indifference. If you can talk to chemists and keep your virtue Or walk with astrophysicists nor lose the common touch. If all scientists count with you but none too much.

If you can follow quantum pathways Familiar to bacteria, plants; all manner of beings That photosynthesise and thrive.

If you can fill the unforgiving minute With sixty seconds worth of distance run Ladies and Gentlemen - yours is the universe and all that's in it And- which is more- you'll be enlightened, empowered and inspired. And yet and yet Nature's mysteries still conspire like Heisenberg's Uncertainty To tunnel, superpose, entangle and decohere Within its very own quantum world so near To cloak its dynamic evolution Allowing only to reveal at any one instant What humans can observe by thought, action, inquiry or experiment; Maybe masquerading as fermionic or bosonic phase transitions.

$2n^2 = n(n+1) + n(n-1)$ TABLE								
						$n(n+1)$	$n(n-1)$	
22	18	14	10	6	2			
22	18	14	10	6	2	42	30	$n = 6$
	18	14	10	6	2			
	18	14	10	6	2	30	20	$n = 5$
		14	10	6	2			
		14	10	6	2	20	12	$n = 4$
			10	6	2			
			10	6	2	12	6	$n = 3$
				6	2			
				6	2	6	2	$n = 2$
					2			
					2	2	0	$n = 1$
					0			
					0	0	0	$n = 0$
					2			
					2	0	2	$n = -1$
				6	2			
				6	2	2	6	$n = -2$
			10	6	2			
			10	6	2	6	12	$n = -3$
		14	10	6	2			
		14	10	6	2	12	20	$n = -4$
	18	14	10	6	2			
	18	14	10	6	2	20	30	$n = -5$
22	18	14	10	6	2			
22	18	14	10	6	2	30	42	$n = -6$

ROBERTS – JANET NUCLEAR PERIODIC TABLE (Table 1)

							∞	∞		
	LIMITS TO QUANTUM ENERGY STATES OF ELECTRONS						\uparrow	\uparrow		
Period 11	221 ^{6h} ₂₄₂	243 ^{7g} ₂₆₀	261 ^{8f} ₂₇₄	275 ^{9d} ₂₈₄	285 ^{10p} ₂₉₀	291 ^{11s} ₂₉₂	2(6) ²			
Period 10		171 ^{6g} ₁₈₈	189 ^{7f} ₂₀₂	203 ^{8d} ₂₁₂	213 ^{9p} ₂₁₈	219 ^{10s} ₂₂₀		2(5) ²		
Period 9		121 ^{5g} ₁₃₈	139 ^{6f} ₁₅₂	153 ^{7d} ₁₆₂	163 ^{8p} ₁₆₈	169 ^{9s} ₁₇₀	2(5) ²			
Period 8			89 ^{5f} ₁₀₂	103 ^{6d} ₁₁₂	113 ^{7p} ₁₁₈	119 ^{8s} ₁₂₀		2(4) ²		
Period 7	ELECTRON		57 ^{4f} ₇₀	71 ^{5d} ₈₀	81 ^{6p} ₈₆	87 ^{7s} ₈₈	2(4) ²			
Period 6	STATES			39 ^{4d} ₄₈	49 ^{5p} ₅₄	55 ^{6s} ₅₆		2(3) ²		
Period 5	OCCUPIED				21 ^{3d} ₃₀	31 ^{4p} ₃₆	37 ^{5s} ₃₈	2(3) ²		
Period 4	BY ATOMS					13 ^{3p} ₁₈	19 ^{4s} ₂₀	2(2) ²		
Period 3	OUTSIDE						5 ^{2p} ₁₀	11 ^{3s} ₁₂	2(2) ²	
	STARS									
Period 2							3 ^{2s} ₄	2(1) ²		
	$\infty \leftarrow$									
	51 - 72	33 - 50	19 - 32	9 - 18	3 - 8	1 - 2	GROUP			
Period 1						1 ^{1s} ₂	2(1) ²			
	ZERO POSITIVE ELECTRIC POTENTIAL							2(0) ²		
	INFINITE NEGATIVE ELECTRIC POTENTIAL							2(0) ²		
	RESERVOIR ENERGY						2	2(-1) ²		
	STATES OCCUPIED						2	2(-1) ²		
	BY PROTONS IN						6	2	2(-2) ²	
	PLASMA PRIOR TO						6	2	2(-2) ²	
	FUSION						10	6	2	2(-3) ²
			14	10	6	2		2(-4) ²		
			14	10	6	2	2(-4) ²			
	18	14	10	6	6	2	2(-4) ²	2(-5) ²		
	18	14	10	6	6	2	2(-5) ²			
							\downarrow	\downarrow		
							∞	∞		
STRONG FIELD CLOAKS QUARKS FORMING LARGER NUCLEI AFTER TRIGGER OF FUSION BY WEAK FORCE										

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