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Extended Abstract

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Implications of the link between the Periodic Table and the Standard Model

John Owen Roberts

Open University, UK

E-mail: johnroberts048@gmail.com

The mathematics of quantum physics from the standard model using groups U(1)xSU(2)xSU(3) and the Pauli Principle produces two sets of time independent quantum states n(n+1) and n(n-1) where n is the principal quantum number. Oscillations between these states result in a one to one mapping with the Roberts-Janet Nuclear Periodic Table by interpretation of n > 0 for condensed matter and n < 0 for plasma prior to fusion. The mechanism provides a framework for Periodic Tables for every supernova by excluding mass number. In the lower half of the table occupation by bosons leads to increased energy densities in which an ensemble of outcomes is discussed including cyclical universes and multiverses. A hypothesis of string theory is proposed at the nuclear end of the table merging into quantum loop gravity at the condensed matter top end of the table. Those Infinities and the Periodic Table, John O Roberts April 2016, Proposed Link between the Periodic Table and the Standard Model. Journal Materials Science and Engineering August 2017.

Chemistry emerges from the set of time independent energy states in quantum mechanics as condensed matter represented by the top half of the Roberts-Janet Nuclear Periodic Table while the lower half indicates the energy levels in the phase of plasma prior to fusion. There are no prescribed energy values as in the stable states $\Delta t \rightarrow 0$ so Heisenberg's principle implies ΔE is empirical not theoretical. As the energy states in matter move away from the nucleus at the order of 10-10 m to 10-8 m towards ionisation and classical physics they converge. $\Delta x \rightarrow 0$. Heisenberg's principle implies an overlapping of states consistent with a variation in the filling of energy levels by electrons for n>2. Spatial variation becomes increasingly blurred given the shape form and density of each time independent wave function as predicted by quantum mechanics including quantum tunnelling and electron capture.

The overall framework in both tables is unaffected. The first state indicates the beginning of two quantum states s,p; the first indicates the beginning of three quantum states s,p,d; likewise indicates the beginning of s,p,d,f states in spectroscopy. The periodicity of eight intuitively recognised by Mendeleev can be explained by anecdotal evidence from flocks of starlings. They can perform a mesmeric murmuration or wave dance – the nearest macroscopic movement we have to an electron probability density wave with the birds acting as particles and the flock as the wave. Research models have shown that provided the birds monitor the speed and direction of their seven nearest neighbours no collisions occur; so with the electrons and their electric field. Group number is now defined as the maximum number of electrons in any one period. A period is defined by the s states. Period 1 corresponds to 1s, period 2 to 2s etc. For illustration purposes the table is extended to 2(6)2 to indicate the relationship between periods, quantum states and group number. This leads to atomic number 292 at the top of the table. However nuclear instability is the most likely determined. The presence of isotopes challenges whether the periodic table is unique and implies there are many solutions for the boundary conditions in the production of elements in stars and supernovae. The Roberts-Janet table appears to unify the mechanism for the production of such elements in stars and supernovae but not the production of elements from collisions of neutron stars.
No timescale is proposed on the frequency of such big bangs until the distribution of white and dark matter is established within the known universe or any interaction with pocket universes or multiverses.
It cannot choose to incorporate parts of 20th century science which reinforces and generalises the Periodic Table whilst ignoring or dismissing the implications of other 20th century and 21st century science that challenges some of the reasoning implicit in the table.
Observations from Jupiter confirm evidence of metallic Hydrogen and the positioning of Helium in the RobertsJanet table implies metallic Helium is possible under suitable conditions as both elements' electrons may become delocalised. In other groups significant differences of physical states between elements does not prevent a group system emerging. E.g. Nitrogen and Phosphorus or Oxygen and Sulphur. So why in the cases of Hydrogen and Lithium or Helium and Berylium is this not possible?

Janet's idea of quantum states based on s, p, d, f appears to be dismissed mainly because Hydrogen and Helium would be placed in the groups of alkali metals and alkali earth metals. The Periodic Table is too important to be left only to chemists as is the Standard Model too important to be left to particle physicists only.

Bottom Note: *This work is partly presented at International Conference on Planetary Science and Particle Physics*, August 27-28, 2018, Boston, USA