Physics schedule for 2018

Jim Adams

The physics programme is now divided into the writing of three books. Mainly written by Jim Adams, material for *Investigations into universal physics* has accumulated throughout the first quarter of 2018. Some new developments are firstly, the realisation that the Garcíon propagators imply that the universe is 'on' every integer third time unit and 'off' for the other two. Secondly, we understand that the model where the universe results from all additive, subtractive and multiplicative states generated from the propagators (division is disallowed in the model, since division by zero is the standard one for a field, and this reduced all states down to one – later we may include all superexponential operations) implies both local and cosmological interaction between states. The latter implies that cosmologically the energy of distant states is increasing, and that the inflationary expansion of the universe is not an initial event, but continues for all time. Thus we expect results which correspond with a negative cosmological curvature, and this is confirmed by experiment. Third, from Wedderburn's little theorem for novanions, that finite division algebras are commutative, and thus cannot result in novanion states, we have introduced an infinite state model built upwards from unit integer states. This continues for the novanion ring model we have adopted without division. We are developing the model of the quantum vacuum as a novanion lattice built from these unit states. Two speculative models of mass have been considered in this model. The first gives an occupancy number to each node of the lattice, depending on the number of times it is generated from the states. Locally, this is finite, since the relativistic novanion norm, or line element, of two propagators taken multiplicatively is the product of their norms. We then take mass as the occupancy number of the nodes of the vacuum lattice. The second, related to the weakness of the gravitational interaction, states that mass is not a multistate in the vacuum, but a hole within the space states of it. Thus, mass is a consequence of other interactions in this model, and behaves as a weak perturbation of these interactions, probably, if we consider electromagnetic effects, of the right sign. We consider that occupancy states of the vacuum means this is not everywhere in equilibrium. Occupancy as a gravitational state implies that the vacuum is not everywhere uniform, and is subject to gravitational interaction, including an implied connection with 'dark matter'. Fourth, as a consequence of the finite model, we consider, since all states are generated multiplicatively, how we arrive at approximate inverse laws for potentials and inverse square laws for forces. In fact, we can think of both energy and force within the novanion model. We note that although two novanion states multiplied together create a new state in the system, if we looked in the reverse direction, although division exists for precisely these states as a reinterpretation of multiplication, if we chose two states, where one is arbitrary, that is, not necessarily generated via a Garcíon, then the division will not always exist. In other words, division is quantised. This means that energy and force interactions are always quantised in the model. A problem exists of how to locate energy states and forces within this multiplicative, additive and subtractive model. Inertial systems are generated from additive and subtractive space states with an associated time state. This means that uniform motion is available in the model from non-multiplicative

states. For multiplicative states in combination with additive and subtractive ones, this is a combination of inertial states interacting with energy potentials. For these potentials to be localised, they have to be generated by division and not multiplication. We then have to find states that are interpreted physically, as rather abstract systems of novanion additive, subtractive and multiplicative interactions. Since relativity is embedded within the novanion model, albeit as a multidimensional novanion line element, we believe the theory induces predictions of its behaviour. There should be higher order ways of looking at interactions other than energy and potentials, although locally these should be small. Also, multiplicative interactions (as we have already mentioned cosmologically) are present also in the model, since from subtraction difference states always exist. We need a theory which generates the strengths of these interactions, and we think, but have not yet properly looked into this, that they arise from the Heim interpretation of states in the model, essentially the same, we hope, since the Heim model predicts the particle mass spectrums, as the Garcíon generators. Finally, there is the Heim model of the fine structure constant. We do not yet understand this fully, but our model, which is essentially a novanion relativistic one, generates a quantum theory as a consequence of this constant. We also need to say that there is probably an observable difference between a novanion ring model, where distance is novanion imaginary, and a tharl ring model, where the square of distances, which still anticommute, have square 1. Although the tharl ring model generates the relativistic line element directly, whereas in the novanion model relativity is obtained from the observer being situated physically in space, we think at the moment that the novanion model generates results in accordance with van Flandern's observations, so that the underlying reality is a type of extended Pythagorean one, and not inherently relativistic.

Another book, with strong input from Graham Ennis, is *New physics for engineers*. Graham is going to Belgrade at the end of May to look at the Tesla archives. We will be looking at vacuum energy effects, and experimental evidence.

The third book is *Elements of universal physics*. This will be a book with a popular audience. We will keep the maths to an absolute minimum, and never go beyond vectors.

The schedule is that Jim Adams, having completed a stage in the write-up of *Number*, *space and logic*, is spending some time on completing *Shining light on solar panel*s. After this work on *Number, space and logic* is scheduled to continue until 7th September 2018. After this, it will become background to the development of the work on physics.

Physics schedule up to last quarter 2017

Pictures of physics: *A history of early physics* will not now be written. Its chapter headings have been archived.

(II) and (III) below have now become *New physics*, divided into seven parts. Parts I to III will be completed first. Their contents will be extracted and converted into journal articles. *New physics* will not be entirely accessible until these articles are submitted. The mathematical

background in *New physics* will, however, become available before then, as and when these parts are stabilised.

The theory presented has developed so that the idea of novanion propagators is fundamental. Space metrics for self-interactions including those for special and general relativity, and a generalisation of Yang-Mills theory, Feynman propagators and Heim theory for multiple interactions can all be expressed in terms of this idea.

Previous version

Three eBooks are scheduled, all by Jim H Adams and Graham Ennis:
(I) *Pictures of physics*: *A history of early physics*.
(II) *Pictures of physics: Gravity and electromagnetism*. There will be an augmented edition, nine months after the first. We have decided that papers will be written for this work, before the book *Universal physics*.
(III) *Pictures of physics: Universal Physics*.

Gravity and electromagnetism will have work from
(1) From memory, there are three sources of behaviour in spinning systems like the Earth, the gravitational force giving rise to the inertial component, the Gaussian force and the Coriolis force. Investigate mathematically using Newtonian mechanics and gravitation the behaviour of gyroscopes, with reference to the demonstrations by Eric Laithwaite and others, that it is easier to pick up a heavy gyroscope that is spinning than one that is not. Investigate, using Newtonian mechanics, whether it is possible or impossible to convert the kinetic energy of the gyroscope to enable transference to the potential energy of a Newtonian gravitational field, and if so, whether this transference is reversible. Devise experiments to look at putting more energy into a gyroscope for which there is an increment in the angular momentum of the gyroscope whilst it is spinning, and whether or not there are cross product forces when this happens creating uplift or downlift.

(2) Look up the experiments involving superconductivity and gravitation, and document this research.

(3) Investigate further the negative pressure Einstein lambda term in the general relativistic field equations (this is basically antigravity, and is accepted as conventional wisdom by the theoretical physics community). Then look at its cosmological implications, and connect this with particle physics, by looking at ZPE (zero point energy) implications where the Larmor radiation of an electron in an orbital is replaced by an inverse seventh power Einstein antigravity for a local space with space-time components of dimension greater than four. Find the ZPE energy given by Michio Kaku in his book and compare with my own computations.

(6) In recent work I looked at the Lorentz transformations as I had done in the work *Vector Algebra*, and their derivation using quaternions. Amazingly, although I got out the Lorentz transformations by this means, I did not retrieve the Poincaré transformations, but something else. This is because in the rest frame of a moving observer, if, say, his ruler is expanding

(which would not normally happen), then the Poincaré transformations assume Galilean transformations rather than relativistic ones for this ruler.

(7) The Einstein gravitational + electromagnetism field equations are matrix equations. I have said I would re-express these in terms of their eigenvalues. The Newtonian potential is scalar, so there should be a comparison between the two conceptions, since eigenvalues are scalars.

(8) Look at MOND (modified Newtonian dynamics).

Universal Physics will have work from
(1) Continue reading both of Burkard Heim's volumes on a theory of everything (this is in German – Elementarstructuren der Materie, Band I und II). There are many connections here with the research program Graham Ennis and I are conducting. The original intention was to connect this with the theory of novanions, but it is more important for now to get a basic grip on the calculations. It may be possible that Heim's theory can be represented novanionically, and some initial calculations to look into the subject have already been made. The novanionic manifold is oriented, but a Möbius strip, in which spinor manifolds and the Dirac equation for leptons can be accommodated, is not. Consequently the novanionic space can be reconnected locally or globally so that it becomes unoriented to describe leptons. When this allocation is made, the model allows both a bosonic 26-dimensional space-time structure corresponding to Heim's claim that his theory can be described in a 25-dimensional space model, and a 10-dimensional fermionic space-time structure, a number also present in heterotic string theory, which corresponds to the Heim space model with 9 space dimensions. I find interesting Heim's claim that photons have (small) rest mass. There is the question in this regard, raised by Graham, of whether photons have velocity dependent on frequency, as was detected in early experiments by Wheatstone and Kelvin. In a conversation with Graham, I noted that experiments to determine the velocity of light have increased in value over historical time, and this could be due to higher frequencies being used to increase the accuracy. My attitude is that care is taken in theory and experiment, so that such effects ought to have been discounted. However, my experience of mathematics does not always uphold the status quo, so it is possible that theory-violating effects have been ignored. I need to understand better the standard model of particle interactions, in order to compare this with Heim's theory, to link it with nonstandard effects like neutrino oscillations, and to get a better understanding of the physics, in its theoretical and experimental sides. Graham has asked me to give an account of the Heim theory, and how it relates to other research.

May 2017: There is now the following chapter on the 'Borcherds-Hajas novanion conjecture' in www.jimhadams.com/ns/ns1-04NovanionGroups.pdf. I would like to add the comment that Witten has written on the use of the Lie algebra E_8 in describing the particle spectrum beyond the standard model. There is much comment that the exceptional Lie algebras, like E_8, are connected with the octonions. The 26-novanion algebra contains the octonions, and should therefore be expected to contain an extension of the standard model.