

Physics schedule for first quarter 2017

Jim Adams

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 – *Elementarstrukturen 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/ns3-08BorcherdsHajas.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.