

## Essay 86: The New ECE Theory

The new ECE theory of July 2013 is based directly on the most fundamental theorem of geometry, known obscurely as the tetrad postulate. This theorem means that the complete vector field is independent of the coordinate system used to describe it. In UFT 245 it was shown that the tetrad postulate produces both the field and wave equations derived by Proca in the nineteen thirties to describe electromagnetism with a massive photon, or a photon with mass. The additional hypothesis made in the new ECE theory is that the Proca field is directly proportional to a well defined difference of geometrical connections. The Proca field thus defined becomes part of the electromagnetic field defined in the original ECE theory of 2003. The Proca wave equation remains the same as that derived in 2003 from the ECE wave equation. The latter is also derived from the tetrad postulate. So the entire Proca theory has been reduced to the most fundamental theorem of geometry given three interrelated hypotheses.

There is no room in this theory for a massless photon. It seems that Proca's purpose was to extend the Dirac equation from fermions with mass to bosons with mass, and there is a Dirac like solution to the Proca wave equation. For a while the Proca theory caused quite a stir, because it was thought that the Yukawa potential was a physical solution of the Proca equation. The Yukawa potential was thought to provide a description of the short ranged strong nuclear force, but the Yukawa potential was abandoned in favour of the current theory of the strong nuclear force based on quarks and gluons : quantum chromodynamics (QCD). QCD is a pleasurable illusion because it is constructed with many adjustable parameters and concepts that cannot be tested experimentally such as approximate symmetry, the removal of infinities (renormalization, or in Feynman's words "hocus pocus"), arbitrary adjustment of charge (dimensional regularization), asymptotic freedom (more adjustables), supersymmetry (yet more adjustables), a vacuum consisting of degenerate vacua (more adjustables and unmeasurables), spontaneous symmetry breaking (an unmeasurable of the degenerate vacuum), and to cap it all, a god particle as theological and unmeasurable as any miracle. By now there are mini god particles called higgsinos which may be of classical Greek origin.

Back in the real world however, geometry leads to the Proca structure and not to the theory of electrodynamics with zero photon mass. The latter rests on the d'Alembert wave equation and not on the Proca wave equation. It has been well known for a decade that the ECE wave equation of 2003 produces all the wave equations of physics in such a way that every particle has mass. The new ECE theory also produces the Proca field equation, and should also produce a new type of Dirac field equation. There are many ways in which the new ECE theory can be developed. The new ECE theory predicts the existence of a vacuum four potential which is proportional to a vacuum charge current density. It is well known that harmonic oscillator type fluctuations of the vacuum charge current density give the radiative corrections. The latter are experimentally measurable and include the anomalous g factor of the electron, the Lamb shift and the Casimir effect.

The Proca field of the new ECE theory is part of the complete non linear field of the original 2003 ECE theory, a non linear field defined directly by the first Cartan structure equation. The symmetry of the non linear ECE field is also governed by the tetrad postulate and first Cartan structure equation, and the complete non linear field is also governed by the Cartan and Evans identities of geometry. The Proca field therefore becomes a sub structure of the non linear field. The latter defines the B(3) field responsible for the inverse Faraday effect, or magnetization by circularly polarized irradiation of material matter, for example one electron.

Therefore the whole of physics is reduced to quite a simple geometrical structure that eliminates the pleasurable fantasies of standard physics in favour of common sense. The

latter does not need much funding from the taxpayer, who funds the pleasurable fantasies without knowing anything whatsoever about what they may mean. In fact they mean next to nothing in Baconian physics.