ESSAY 36 : The Nature of the B(3) Field

The B(3) field is a radiated magnetic flux density (in units of tesla) that is always present in circularly polarized electromagnetic radiation of any frequency. It was inferred in November 1991 from the frequency independent magnetization of the inverse Faraday effect. The latter is the name given to magnetization M(3) of material matter by circularly polarized radiation. The index (3) denotes Alongitudinal@, whereas the indices (1), the complex conjugate of (2), denote Atransverse@. The relation between the indices (1), (2) and (3) is cyclical, in the same way that the relation between the Cartesian unit vectors is cyclical. Therefore (1), (2) and (3) make up a description of ordinary three dimensional space. Similarly the fields B(1), B(2) and B(3) exist in three dimensional space, and these three fields are related in the same way as (1), (2) and (3) are related. So the existence of B(3) is a consequence of the existence of B(1) and B(2). This statement is encapsulated mathematically in the B Cyclic Theorem which I inferred in the mid nineties. The B Cyclic Theorem reduces straightforwardly to the cyclical relation between the unit vectors e(1), e(2) and e(3), and so reduces to the ordinary cyclical relation between the Cartesian unit vectors i, j and k. The unit vector k is the same as e(3), and the existence of k follows from that of i and j.

The B(3) field is therefore an inescapable consequence of the existence of circular polarization in electromagnetic radiation. To assert that k does not exit in three dimensional space is absurd, so to assert that B(3) does not exist is absurd.

By now the reader of these essays and listener of these broadcasts might half expect a dogmatic challenge to common sense, and indeed the standard physics asserts that B(1) and B(2) exist but B(3) does not. This is in fundamental contradiction with geometry, but this dogma is the basis of the U(1) gauge invariant theory of electromagnetism and the idea of a massless photon. A massless photon must have only two transverse degrees of polarization in the now extinct dogma. A photon with mass has three degrees of polarization in space, and four in spacetime. So in the old standard model the inverse Faraday effect was described by the conjugate product B(1) x B(2) (the vector product of complex conjugates) but without use of B(3). This is blatantly incorrect, as shown by the B Cyclic Theorem. The latter is the frame of reference itself as described. So through the medium of the B Cyclic Theorem the old dogmatists were thrown back on total nonsense: denying the existence of the frame of reference.

The notorious stalker Gerhard Bruhn tried to do this by claiming that the B Cyclic Theorem was not covariant. That would mean that the everyday frame of reference itself is not covariant. By using the prejudicial hubris and arrogance of standard journals such as Physica Scripta and the corrupted Foundations of Physics (forcefully taken over by >t Hooft) Bruhn forced this idea into print. I was not allowed to reply until I was asked to edit my own journal, Journal of Foundations of Physics and Chemistry. At about the same time as this journal started to publish in May / June 2011, the Kurata / B(3) technology resulted in its first full scale industrial plant. The original AFoundations of Physics@, edited by van der Merwe was subjected to intense e mail harassment by the same Bruhn, who organized attacks on the editor van der Merwe. Bruhn has been retired for a number of years and is a well known fraudster.

The behind the scenes activist David Buckingham produced what is probably the most absurd argument against B(3): Acomplete experiment symmetry@. I do not think that anyone understands this idea, and it has been completely forgotten. By invoking the occult in effect, Buckingham simply asserts that B(3) cannot exist. The political activist Lakhtakia went a step further and rejected B(3) on the grounds of personal animosity. He found it

Aghastly@, so it does not exist. These are indeed tales told by idiots in the manner of the Macbeth soliloquy, and this is what happens when the ivory walls reflect an empty mind echoing to itself. According to Lakhtakia, if one does not like gravity one can jump over a cliff and float. So much for reason and experience.

In ECE theory, B(3) is defined by the connection term of Cartan geometry, i.e by spinning and translating spacetime itself. The ECE theory was actually inferred in Spring 2003 from the need to incorporate B(3) theory into a new general relativity. In the early days of B(3) theory it used to be confused with a static electromagnetic field. My UNCC colleagues were particularly adept at making this confusion. The B(3) field is a radiated field, and propagates with the electromagnetic field. In the ECE field equations it is described by an index called a, which is set to (3). The electromagnetic field can only ever be measured when it interacts with matter, a receiver: in the simplest case one electron. The B(3) component always produces the M(3) magnetization of the inverse Faraday effect, and that is always produced through the intermediacy of a hyperpolarizability. This mechanism is quite different form that of a static magnetic field. In the old Maxwell Heaviside theory this process was described by an hoc or empirical conjugate product which was incorporated into the constitutive relations. In great contrast ECE theory incorporates B(3) through a unified field theory with a rigorously non linear electromagnetic sector.