Prof. David A. King, F.R.S.,
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Dear Prof. King,

Thank you for your note of 2nd April. It would be helpful if you give me your e mail address. My views on the Comment by Comay are sought, and the Comment is to be sent to an independent referee. It is claimed by the author that the B(3) field violates the Maxwell equation which equates in vacuo the curl of magnetic flux density to the displacement current. This assertion is made using an analysis based on dipole radiation. The correct description of the radiated B(3) in this instance is given in "The Enigmatic Photon" (Kluwer, Dordrecht, 1996), volume three, by Vigier, Roy, Jeffers and myself. The B(3) field has been corroborated theoretically by the following:
1) A. Chubykalo and R. Smirnov-Rueda, Phys. Rev. E, in press (1996).
2) A. Chubykalo, R. Smirnov-Rueda and M. W. Evans, Phys. Rev. Lett., to be submitted.
3) V. V. Dvoeglazov, Phys. Rev. D, in press (1996).
4) Additionally, there are by now many papers and reviews available in the literature giving longitudinal solutions of the vacuum Maxwell equations, a short history and bibliography is appended to this letter.

The Editor of "Chemical Physics Letters", Prof. A. D. Buckingham, is NOT impartial in this case. Furthermore, a closely related paper by Comay has been submitted to "Foundations of Physics Letters", and has been rejected by at least two referees. It is also significant that all criticisms to date have been directed at myself, despite the fact that there are many papers available by now which show the presence in vacuo of longitudinal components in Maxwell's equations themselves. Finally, it is well known that I was forced to resign my position as full professor at UNCC, following a barrage of attacks by Buckingham, Barron, Lakhtakia and Grimes. I have subsequently been unemployed for 16 months, and Buckingham has been fully aware of this situation for nearly a year. Colleagues, appalled by all this, have sought to help with visiting and honorary professorships, and have continued to recognize my title and rank of full professor. In view of this, is it really likely that any reply of mine will be processed impartially by "Chemical Physics Letters"? Accordingly I will ask colleagues to join me as co-authors in a reply to Comay, and we will suggest a referee for this reply. This whole process has already been gone through once before, when all my attempts to reply to Barron were blocked by Buckingham in an incessant stream of faxes and letters throughout the whole summer of '93. This bombardment was finally brought to an end by the intercession of the late Mansel Davies. This finally forced Buckingham to reject Barron's paper.

In this instance, Comay's equation (4) is trivially incorrect because he asserts that the curl of B(3) is non-zero. In order to arrive at this result he sets up a line integral over an arbitrarily chosen segment, and incorrectly finds that the line integral is non zero. The correct evaluation of an integral over his path along +Z, +X, -X, and -Z is integral over B(3) + 0 - 0 - B(3) = 0, because B(3) = B(0)e(3) and e(3) (the unit vector along k) reverses sign if we turn around from +Z to -Z. This is checked because curl B(3) = 0. Comay then asserts that

dE(3) / dt is non-zero due to curl B(3), and erroneously concludes that the ".....flux through the area A increases indefinitely".

Comay has not shown violation of Maxwell's equations. The basis of his paper is the use of two equal and opposite charges rotating about Z. The resultant static magnetic field along Z is zero, and the net radiated B(3) is zero. This is because the magnetic field set up in +Z by one charge is cancelled by another set up in -Z by the other charge. Thus, the true line integral in Comay's equation (4) is zero, and the curl of a net zero B is zero for any area or any segment. This is an independent check of the above result.

Comay has statements to the effect that I am trying to discredit Maxwell. This is unhelpful. He is correct in one respect, the B cyclics are non-Abelian, non-linear, whereas Maxwell is linear. The B(3) field is always defined through the conjugate product A(1) x A(2) of potentials in vacuo, and its interaction with matter, such as an electron, is determined by A(1) x A(2) through the Dirac equation. This interaction is relativistic in nature and worked out in detail in the volumes of "The Enigmatic Photon", to which Comay does not refer. It is significant that he does not refer to my co-authors, who obviously share my views. He omits reference to the large amount of independent work, both theoretical and experimental, on longitudinally polarized solutions of the Maxwell equations themselves, and omits reference to scholarship on longitudinal solutions of this nature going back to Dirac, Oppenheimer, Majorana, Podolsky, Fock, and Wigner, all of whom indicated the presence of these solutions in the vacuum. In contemporary times, they have been re-derived independently several times. A bibliography is appended to this letter.

There are many errors of grammar. For example:
1)"Maxwell equations are known.." should be "The Maxwell equations are.."
2)"Thus this kind of solutions.." should be "Thus this kind of solution."
3)"An attempt is...carried out for several years." should be "Attempts have been made...over a period of several years."
4) "The formulation...is followed with an attempt aiming to discredit properties.." should be "The formulation attempts to discredit.."
5) The quotes of my work in Comay's paper suggests a shaky knowledge of English, and the quotes are out of context.
6) "..electrodynamics is inconsistent.." should be "...are inconsistent."

The sarcastic tone of the Comment is emphasized by the author listing all my single author papers in a long list from (4) to (28); while omitting all reference to the monographs on B(3) now available. Then follows a list of critical papers which are accepted without comment. There is no reference to my replies to these papers. Would not one suspect, just a little, that the scholarship is just a tiny bit one sided?

A very careful and earnest reply to Comay has been given already elsewhere, and replies to Rikken and Buckingham and Parlett are already in print elsewhere. The onus is on "Chemical Physics Letters" to prove its impartiality, for the following reasons.
1) The Senior Editor, A. D. Buckingham, blocked my reply to a submission by Barron circa 1993, a paper which claimed that B(3) violates CPT. This claim has been refuted several times, the B cyclics are CPT conserving and relativistically covariant. Buckingham and Barron then attempted to publish the same manuscript in Physica B, and were rejected. The same MS was again submitted, this time by Barron alone, to Foundations of Physics Letters, and rejected twice more. It has become clear that large sections of Barron's published work are incorrect - those dealing with diagrammatic constructs that are substituted for physical equations.
2) In a book review published in "Science", Buckingham indulged in a long personal attack on me as co-editor of volume 85 of "Advances in Chemical Physics". This volume has now received an award for EXCELLENCE and has

been reviewed positively elsewhere, for example, "Faraday Transactions". Shortly after the appearance of this review, Autumn of 94, I was coerced into resigning my professorship at UNCC. Buckingham has known this for over a year, and has made no attempt to persuade the UNCC authorities to re-instate me there. Therefore how can he be an impartial editor?
3) Buckingham and Parlett have published a paper in "Science" in 1994 in which the erroneous CPT violation argument is claimed, and which attacks the Princeton data of Warren et alia on ONMR. This was published without my knowledge, and I have replied in "Foundations of Physics Letters". No attempt was made to repeat the experiment at Princeton.

Short History and Bibliography of Longitudinal Fields in Vacuo.
        The existence of longitudinal components in vacuo of electro-magnetic radiation has been inferred independently by several authors {1-10} and it appears likely that the increasing experimental evidence for superluminal phenomena is also evidence for longitudinal modes in vacuo, adding to that already available from magneto-optics. Of these modes, B(3) is the fundamental, phase free spin.
1) Meszaros et al. {1} have developed a very general thermodynamic indication of the existence of B(3) in adiabatically expanding or contracting photon gases; and of distorting or fluctuating electromagnetic fields in which longitudinal components can be identified and / or isolated experimentally, for example through measurements of excess pressure.
2) Chubykalo and Smirnov-Rueda {2} have rigorously identified the B(3) field as a component of their novel theory {3}. This is of key importance because two independent theories give the same result, $F = B(3)$.
3) Dvoeglazov {4} has independently demonstrated the inference that B(3) is the space part of the fundamental Pauli-Lyuban'ski axial 4-vector {5} that is the most fundamental description of the vacuum electromagnetic field. V. V. Dvoeglazov, Phys. Rev. D, in press, (1996).
4) Several empirical indications have emerged of the existence of superluminal phenomena {6}. Theoretical methods have been developed by Recami et al. {7} for the interpretation of these data in terms of classical and quantized tachyons. Recami is the foremost authority on tachyons, and has become interested in the development of related phenomena such as B(3) and B(3) related fields in vacuo {8}.
5) Rodrigues et al. {9} have demonstrated rigorously that there exist longitudinal solutions of the linear Maxwell equations in vacuo which accompany novel superluminal and subluminal phenomena in vacuo.
6) Pope {10} has developed the philosophical foundations of special and general relativity to encompass action at a distance, an interpretation first proposed by Lewis in 1926 and confirmed by Bondi and Einstein in correspondence with Pope {10}.
        The B(3) field is now recognized as the fundamental phase free spin variable in electrodynamics. There are several other types of longitudinal fields accompanying the recently empirically verified phenomena of photon tunnelling. The recent criticisms of B(3) cited by Comay are regarded as insubstantial, and have been answered in all detail. Comay's latest critique is both insubstantial and incorrect.
        Additionally, the historical development of longitudinal fields and interactions in vacuum electromagnetism has occurred throughout the twentieth century. For example, in the following compilation mostly by Prof. Dr. V. V. Dvoeglazov.
') In the scientific manuscripts of Ettore Majorana, 1928 to 1932, edited by R. Mignani, E. Recami, and M. Baldo, Lett. Nuovo Cim., 11, 568 (1974).
) J. Robert Oppenheimer, Phys. Rev., 38, 725 (1931). This paper on page 733 indicates the En = 0 "acausal solution", and ties it in with electrostatics, as indicated cotemporaneously by P. A. M. Dirac.

9) The acausal solution was confirmed independently by E. Gianetto, Lett. Nuovo Cim., 44, 140 (1985); and again by D. V. Ahluwalia and D. J. Ernst, Mod. Phys. Lett., A7, 1967 (1992).

10) Eugene P. Wigner, Ann. Math., 40, 149 (1939) identified the "additional, discrete, PHASE FREE (N.B., MWE) variable".

11) M. W. Evans, Physica B, 182, 227, 237 (1992) indicated the relevance of the $En = 0$ solution to longitudinal magnetic modes, namely B(3), and with Vigier and others, formulated the B Cyclic field equations.

12) G. Hunter and R. L. P. Wadlinger, Phys. Essays, 2, 156 (1989) formulated a pure electromagnetic particle, a photon with three dimensional volume, and provided important corroborative empirical evidence.

13) V. V. Dvoeglazov, Tu. N. Tyukhtyaev and S. V. Khudyakov, Russ. J. Phys., 37, 898 (1994) pinpointed inconsistencies between the Maxwell and Joos Weinberg formalisms. Dvoeglazov has developed a non-Maxwellian theory of electromagnetism in vacuo (Found. Phys., in press, four papers).

14) P. A. M. Dirac consistently for fifty years advocated the existence of longitudinal electric and magnetic components in vacuo.

15) H. Munera and O. Guzman, Found. Phys. Lett., in press, have indicated the existence of a whole new class of longitudinal solutions in vacuo of the Maxwell equations, and so by now have several others.

16) Several important empirical experiments are in the design stage to look for B(3) at order one, for example the experiment of S. Jeffers and his group at Toronto, Canada.

IT IS SIGNIFICANT THAT E. COMAY HAS FAILED TO REFER TO ANY OF THESE PAPERS, AND TO REVIEW ARTICLES AND BOOKS.

REFERENCES
{1} M. Meszaros, Found. Phys. Lett., submitted, 1996.
{2} A. Chubykalo and R. Smirnov-Rueda, Phys. Rev. E, in press (1996).
{3} A. Chubykalo and R. Smirnov-Rueda, Phys. Rev. E, in prep.; A. Chubykalo, R. Smirnov-Rueda and M. W. Evans, Phys. Rev. Lett., in prep.
{4} V. V. Dvoeglazov, Phys. Rev. D, in press; Found. Phys., in press.
{5} M. W. Evans, Physica A, 214, 605 (1995).
{6} I. F. Mirabel and L. F. Rodriguez, Nature, 371, 46 (1994); E. W. Otten, Nucl. Phys. News, 5, 11 (1995); W. Heitman and G. Nimtz, Phys. Lett. A, 196, 154 (1994); predicted by E. Recami, Rivista N. Cim., 9(6) (1986).
{7} A. O. Barut, G. D. Maccarone and E. Recami, Nuovo Cim., A71, 509 (1982); V. S. Olkhovsky and E. Recami, Phys. Rep., 214, 339 (1992); E. Giannetto, G. D. Maccarrone, R. Mignani and E. Recami, Phys. Lett., 178B, 115 (1986); E. Recami, Found. Phys., 17, 239 (1987) and several definitive monographs.
{8} M. W. Evans, J.-P. Vigier, S. Roy, S. Jeffers and G. Hunter, authors and editors of the first four volumes of "The Enigmatic Photon" (Kluwer, Dordrecht, 1994 to 1997), with several contributed articles in vol. four by several leading experts cited herein.
{9} W. A. Rodrigues Jr. and J.-Y. Liu, RP 12/96, Institute of Mathematics State University of Campinas, Sao Paolo, Brazil, (1996) (review); W. A. Rodrigues, Jr., and M. A. F. Rosa, Found. Phys., 19, 705 (1989); W. A. Rodrigues, Jr., Q. A. G. de Souza and Y. Boshkov, Found. Phys., 25, 871 (1995).
{10} V. Pope in ref. (8); vol. 4; letters to Pope from Sir Hermann Bondi and Abert Einstein.

Cordially Yours,

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