Contradictory 'Theories'

In the process of an unseemly denunciation of Ivor Catt for his having pointed out "that two eminent scientists provided completely contradictory answers to that question" (a documented fact readily discovered by perusing Catt's many web pages on this topic), two more authors have again provided contradictory responses to The Catt Question, at least in the portions of their responses that can be made sense of.

Both letters in the June, 2009 issue of EW introduce new electricity theories – "Ellis Theory", in which the upper conductor is not charged until the reflected pulse returns, and "Darney Theory", in which the distance between the conductors is a critical variable. Both of these new theories contradict mainstream electromagnetic theory, as well as contradicting each other. Neither one answers The Catt Question – being new theories, whereas The Catt Question is directed at what passes for mainstream theory. Taken together, the two letters form a beautiful illustration of the occulted confusion that reigns at the heart of conventional, mainstream, electromagnetic theory.

We have seen this phenomenon before, in attempting to answer The Catt Question the respondent ends up creating a new electromagnetic theory! Mr Darney even ends with a declaration that "there was certainly no need to invent a completely new theory", after inventing one.

One reason these new theories abound is that conventional electromagnetic theory is an irrational morass of additions, omissions and contradictory statements, leaving the door open for individual interpretation, much like the runes or Tarot cards.

In the new "Ellis Electricity Theory", electric current in the lower wire does not start up until the initial pulse has travelled all the way from the source to the load and begins its return journey. In the new "Darney Electricity Theory" electric current in the lower wire does not start up until some sort of "current" emanating from the upper wire is, somehow, completely intercepted by the lower wire.

Mr Darney claims that "only one explanation is possible: current is departing from the transmission line via capacitive coupling between cable and environment. Moreover, it must be emanating from the signal conductor, since that is the only conductor that is being energized".

Here is, apparently, part of Mr Darney's new theory – that electric current can depart from a wire and move through free space, but only (?) if the current was on a wire at a particular potential relative to another wire. Perhaps the author meant to say "electromagnetic radiation", but he repeats this assertion as "radiated current" and as "each incremental step in the forward direction delivers a transient current pulse into the environment". The reader is left to wonder what the disposition and consequences of these "radiated currents" might be.

The primary hypothesis of Mr Darney's new electricity theory appears to be a partial causality claim, that 'moving electrons on one of the two wires in an electric circuit cause electrons on the other wire to move, but only after a specific time delay due to the distance between the wires'. If this were true, we would find all sorts of applications that could use this principle. We could, for example, design signal delays around it.

A second hypothesis of "Darney Theory" might be that 'energy radiated into free space, as an antenna does, can be completely intercepted by a nearby wire', a hitherto unknown process. If this hypothesis was true, then radio antennae could not work; any nearby metal could completely absorb the radiation.

Ivor Catt, the electrical engineer and scientist, has indeed and long since "set up an experiment, observe how an actual line does respond to a step input, then... analyse and assess the results" as part of his pioneering contributions to high-speed digital logic, electronic systems integration, long-distance communications and fundamental physics.

I urge the experimentalists to repeat these experiments and see for themselves how a transmission line actually "charges" and "discharges".

Kurt Knalty is one such experimenter who has recently obtained the same results that Catt reported back in the 1960s: results which are as different from conventional electromagnetic theory as day is from night.

Forrest Bishop US

CONFLICTING AND VAGUE POSITIONS

I read with interest Ivor Catt's May letter to Electronics World and the June responses by John Ellis and Ian Darney. I would like to congratulate Electronics World for publishing Catt's letter and the responses; albeit I found the responses rather dismissive of the conflicting and vague positions held by major figures in the physics community in relation to the questions that Catt had raised.

It seems to me that this is evidence that many issues must still exist with current theory and one can only ponder as to the reasons why the 'Establishment' seems to have been so reticent for so long to explore the paradoxes of the theory that is being taught to our children at schools and universities.

It seems to me that there's an ever-increasing list of issues raised by Catt and others, from what is apparently a fundamentally flawed theory and one would expect (or indeed hope) that the truth would eventually come out, albeit against the apparent inertia of vested interests.

That being the case, it still could only happen (hopefully) by the efforts of determined and persistent people like Catt, without which the inertia of the status quo would simply retain the current flawed model taught to our children.

Ian Montgomery Australia

WHAT IS LTE?

Helen Karapandžić's article on LTE was very interesting (June issue of Electronics World). If, as she says, LTE "technology can deliver data at a sixth of the cost of UMTS", then I'd say "Go for it!"

Maybe in a future article someone might explain what LTE is and, while they're at it, HSPA, UMTS, HSPA+ and MIMO.

Donncha Butler Ireland

Editor replies: We have had articles in Electronics World magazine on this subject in the past. As a short summary LTE, or Long Term Evolution of Universal Terrestrial Radio Access Network, is a mobile broadband standard, used for mobile, fixed and portable wireless broadband access. It is an update to UMTS; UMTS-TDD, HSDPA/HSUPA and LTE/4G all build upon UMTS-FDD.

LTE is the standard that will allow faster data rates, optimized for IP, packet-based traffic: downlink peak data is expected to offer up to 100Mbps with a 20MHz bandwidth; uplink: 50Mbps, also 20MHz.

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The publisher reserves the right to edit and shorten letters due to space constraints

WATCH OUT FOR THAT LOSSY CABLE

I read Ian Darney's letter discussing transmission line transients in the June issue of 'Electronics World' magazine with some interest. The conclusions deserve closer scrutiny.

There seems to be a false assumption that the line in question was a very good one. Not so. The PVC insulation on the cable used is notoriously lossy even at low radio frequencies and increasingly so as the bandwidth increases.

This means that the propagated wavefront rapidly degraded as it moved to the open and again on its reflected passage as energy at the upper frequencies was dissipated. Hence, 'sharp edges' and 'steep wavefronts' were progressively 'rubbed off' and 'flattened' together with a reduction in the peak amplitude. These factors surely account for much of what was observed.

One must also question the integrity of the instrumentation. In particular, the validity of the current transformer system should have been established by tests on a nearly ideal line model.

In passing this "balanced line with one element grounded" configuration is mentioned in Figure 38 on page 17 of Terman's Radio Engineering Hardbook.

S. Hassell UK

Still Unable to Answer a Simple Question

After reading the letters written in criticism of Ivor Catt, I was puzzled as to why there was a controversy that required such negative rebuttals. The letter written by Ivor Catt in Electronics World clearly states the problem. This is that the scientific community of experts is unable to answer a simple problem in electromagnetic theory in a way that presents a coherent answer to an elementary question regarding the motion of electric current in wires.

Since the textbooks maintain that charge causes electric field and that movement of this charge causes magnetic field, the answer to the Catt question poses a crucial test of the textbook assertions regarding the source of electromagnetic fields. The result that experts in the field can not agree upon the correct answer to the Catt question is an illustration of Catt's assertion that the tradition physical explanation of the problem is incoherent and requires revision.

I think that he is correct in demanding an investigation by the scientific authorities, if only to insure that the textbook answers are all coordinated and give the same answer to this question, rather than giving different and contradictory answers to the question. The reason an investigation or conference to discuss the problem is not wanted by the scientific authorities is that the participants are likely to produce no consensus answer to the question, since they all disagree as to the correct substance of the answer. We see this disagreement in the two different answers given here in Electronics World by Catt's critics.

Those of us who are really interested in the problems of electromagnetic theory would like to have a coherent and rational theory of electromagnetism. Alas, currently there is no such theory at all. The current textbooks teach that the magnetic field vector is the magnetic induction vector B and not the magnetic intensity vector H. This renders the Maxwell equations incoherent. I think this is a much more serious problem than the Catt question. But, if the scientific establishment can't realize that there is a problem in electromagnetic theory regarding the simple Catt question, then it is certainly hopeless that they will straighten out the mess they have created with regard to Maxwell's equations.

I think some action, as requested by Ivor Catt in his letter, needs to be taken by the leadership of the scientific community to resolve the problems in electromagnetic theory that he has raised.

Harry Ricker

PROVOCATIVE QUERIES

I refer to a Letter in the May issue of Electronics World by Ivor Catt, and subsequent Letters by John Ellis and Ian Darney in June.

Besides his technical matter, Catt raises the all important issue of censorship in the publication of scientific papers. There can be no doubt that censorship is rife in matters of scientific publications and anybody who thinks otherwise is either not telling the truth or living in fantasy-land. It is, therefore, to the credit of Electronics World that it has published Catt's letter.

However, the letters by Ellis and Darney do not address the issue of diametrically opposed views expressed by certain experts in the field, as reported by Catt. Such contradictions indicate a definite measure of confusion in established thinking on the subject of electrodynamics and are symptomatic of a deeper malaise in the discipline. No theory is absolute and, so, is always a work in progress. [The field of] Electrodynamics has stagnated for a considerable period of time and is in dire need of improvement. This can only come about by open discussion, free of fear or favour, which, alas, has for a long time been foreign to the circles of science and engineering.

Catt's queries are provocative in that they actually solicit some real thought about the foundations of contemporary theoretical electrodynamics from which other problems with the theory can be revealed and analysed. For instance, the Maxwell-Heaviside equations, as they are always given in textbooks, and almost always in the other literature, pertain to stationary media in that they can be easily generalised to moving media, by which they become Galilean invariant. This stands in stark contrast to the tenets of Einstein's Special Theory of Relativity, which Einstein founded upon his conception of the invariance of Maxwell's usual equations, evidently quite ignorant of the fact that Maxwell's equations are easily made Galilean invariant by means of the very same mathematical apparatus used by fluid dynamicists everyday.

This was first pointed out by Hertz and has been developed in quite some detail by subsequent theoreticians, such as the late British scientist Charles Kenneth Thornhill. But what electrical engineer knows of this work? What 'authoritative' physicist knows of this work? Pitifully few! – because proponents of the established views take deliberate measures to prevent the publication of such works in the journals they control in order to protect their investments (of one sort or another) – convenient for vain glory and self-aggrandizement but anathema to the progress of scientific thought and its applications.

I think it important that Electronics World continue to publish Catt and other authors who are brave enough to voice their objections to what is deemed 'truth', simply by proclamation and authority.

Readers of your magazine are entitled to have before them all the facts so that they can come to a decision on the balance of the evidence, not simply by what so and so might have to say. Authority has no place in science and the democratic vote of scientists and engineers does not determine the nature of the physical world.

Stephen J. Crothers Australia