# Re: why can't fields be quantized too?

***Source:*** http://sci.tech−archive.net/Archive/sci.physics/2005−08/msg03384.html

- *From*: feuerbac@xxxxxxxxxxxxxxxxxxxxxxxxx
- *Date*: 23 Aug 2005 03:27:30 −0700

This is *yet again* you, Qion etc., right?

flames wrote:

[snip]

> A mathematical 'genius' called Dr. Fleming

Who says that he is a mathematical genius?

And what field is his doctorate in? What are his qualifications
to talk about physics?

> has spent over
> 30 years (that is.. he started the study even before
> you were born) researching about Quantum Field Theory, QCD,
> QM, etc. He finally understood how they were 'wrong' and
> will publish the 'corrected' enhanced version in Physics
> Essays to stun the world of physics.

If he writes nonsense like the one below, he won't be able to
get this published.

> He explained it thus
> (has your lab informed you about it in advanced already?):
>
> The terminology of quantum field theory (QFT) is misleading; the
> 'field' referred to is not a field, not the measureable kind of
> E− or H−field at any rate, but it is defined as a field while in
> reality related to classical 4−potentials, i.e. voltages.

Wow. Nonsense already in the very first sentence. A hint to Dr.
Fleming: potentials are also fields. He should learn what "field"
actually means in physics before claiming that QFT is wrong!

BTW: voltages are generally understood to be potential *differences*,
not the potentials themselves. Additionally, one usually only talks
about voltage when referring to the *scalar* potential, not to the
4−potential.

> When compared to SFT, a true 'field' theory, we need to examine what a
> field is at the atomic level compared to dipole and coil
> measurements.

Word salad.

> It is instructive to survey the main equations used
> by physicists since Maxwell's equations
> <http://scienceworld.wolfram.com/physics/MaxwellEquations.html>
> were formulated in 1873. They describe the macroscopic E− and
> H−fields, and their associated charges and currents measured in
> experiments by Coulomb, Faraday, Ampere, Biot, and Savart from
> 1785 onwards. Several EM wave equations
> <http://hyperphysics.phy−astr.gsu.edu/hbase/waves/emwv.html> were
> derived including decoupled forms where the E− or H−fields appear
> in isolation; Maxwell's equations were specialized to various
> applications <http://hypertextbook.com/physics/elec
> tricity/em−waves/> e.g. for quasistationary or radiation
> conditions. Hertz
> <http://dibinst.mit.edu/DIBNER/DIConferences/OldConferences/Sloan/reflecti.htm>'s
> potentials <http://www.andrijar.com/phipps/> introduced a
> mixed−field substitution in terms of a Lagrangian or energy
> density for solving via integrals over radiation surfaces where
> infinite regions needed to be considered; these are known as the
> Hertzian vector and scalar potential wave equations.

Indeed. What Dr. Fleming seems to miss is stuff like the Aharonov−Bohm
effect, which can only properly be understood by using the potentials,
not the E− and H−fields themselves.

> Following theoretical and experimental demonstrations by Planck
> and Einstein of the existence of a quantum physics,

Ouch. In principle right, but so awkwardly expressed that it hurts.

This Dr. Fleming is not a physicist, right? Looking up his website (see
below), he has a PhD in "computational bioelectromagnetics". Why he
thinks this makes him qualified to talk about quantum physics is beyond
me.

> there was a
> failure by physicists to find a mathematics based directly on
> Maxwell's equations that applied to the electron's motion in the
> atom. In 1926 Schr"dinger
> <http://www.missioncollege.org/depts/physics/P4poe/P4D/Schrodinger.htm>
> used energy conservation to obtain a quantum mechanical equation

Only vaguely right. Actually, the Schroedinger equation has not so much to do with the *conservation* of energy. More with simply writing down the equation *describing* the energy of the electron and applying de Broglie's ideas to this equation, leading to a dispersion relation for a wave, and subsequently to a differential equation describing that wave.

> in a variable called the wave function

Calling the wave function the "variable" of the Schroedinger equation is yet again quite strange terminology.

> that accurately described
> single−electron states such as the hydrogen atom. The wave
> function depended on a Hamiltonian function

Actually, a Hamilton *operator*. And "depend on" is yet again strange terminology here.

> and the total energy of an atomic system,

Duh. The Hamiltonian *is* the total energy, so why does he feel the need to mention this separately?

> and was compatible with Hertz's potential formulation.

Huh?

> The wave function depends on the sum of the squares
> of E− and H−fields as is seen by examining the energy density
> function of the electromagnetic field
> <http://patsy.hunter.cuny.edu/CORE/CORE4/LectureNotes/Mwaves/magwaves3.htm>.

Huh????? That is the energy density of the electromagnetic field, right. What what on earth does this have to do with the wave function of the H atom, in Dr. Fleming's opinion???

Yes, he *definitely* has no clue what he is talking about!

> In 1928 Dirac realising the wave functions were not relativistic

Duh. Even Schroedinger realised this already.

> sought a set of equations incorporating Einstein's relativity.

This was already achieved by the Klein−Gordon equation. So Dr. Fleming
also has no clue of the historical development, and what Dirac's
achievement really was.

> Dirac's equations
> <http://www.physics.orst.edu/~allenlw/Ph65456/Media/PDFs/QM656.24.Dirac(3).pdf>
> were described in terms of two 'fields', the so−called Dirac
> fields, and were described as 'field equations of motion'.

As were already lots of equations in the decades before. Dr. Fleming's
point is here exactly what?

> The term "Dirac's two wave equations" was also used. Like
> Schr"dinger's equation, there was a mathematical smearing of the
> SFT fields as we shall see.

What is "mathematical smearing" supposed to mean?

> The problem was now 'wave−like'

Huh???

> instead of two uncluttered fields

Huh???

Is Dr. Fleming unaware that a wave *is* a (special type of) field?

> and Heisenberg formulated the uncertainty principle
> <http://zebu.uoregon.edu/~imamura/208/jan27/hup.html>. The
> underlying SFT centre−of−motion fields had been lost in the
> potential equations.

Huh???

> By the time the equations governing the weak

> and strong nuclear forces were found using modern versions of
> QFT, quantum electrodynamics (QED) and quantum chromodynamics
> (QCD),

Neither QED nor QCD are about the weak force, and QCD is not about the strong *nuclear* force.

> any fields, macroscopic or atomic, were a long−forgotten
> reality.

Utter nonsense.

> But why can't the potentials give us a correct picture of the E−
> and H−fields at atomic levels? After all we have Hertz's
> potential equations that give a correspondence between classical
> potentials and fields? The question is: do Maxwell's E− and
> H−fields determined between point−charges exist within the
> nanoscopic domain of the atom?

Both E− and H−fields and potentials are mathematical descriptions of reality. If they "exist" or not is not a question of physics, but of metaphysics.

> Recently it has been demonstrated by EMSFT for the hydrogen atom
> <http://www.unifiedphysics.com/UP_EM_self_fields_all_in_one_revb_Nov_08_04.pdf>
> that these E− and H−field forms are not applicable to sub−atomic
> charges.

Oh, finally a link to a page written by this crank.

And as most cranks, he does not understand the difference between "demonstrated" and "asserted".

Quote: "Despite intensive investigation, this same period saw a complete failure to find any way in which atomic physics could be based on electromagnetic (EM) theory."

Hogwash. The Schroedinger equation for the H atom incorporates the electrostatic potential, hence it *is* based on electromagnetic theory. Apparently Dr. Fleming thinks that if the E− and H−fields themselves do not appear, but only the potentials, this somehow means that it is *not* based on electromagnetic theory! Balderdash.

Another quote: "In this paper an EM self−field theory (EMSFT) yields analytical solutions to the electron's motion in the hydrogen atom including Rydberg's number and the Balmer formula."

Since there is abundant evidence that the electron does *not* move on a
classical orbit in the atom, EMSFT is already disproven by experiment.

> Why? The analytic solutions obtained from EMSFT for the
> hydrogen atom are validated by the known spectroscopy where we
> determine the atomic fields between centres of motion and not
> between charge points.

Word salad.

> This issue is at the crux of why classical
> vector and scalar potentials cannot obtain the correct solution;
> the macroscopic fields of Coulomb and Biot−Savart do not hold at
> atomic dimensions;

What on earth has the first part of the sentence to do with the second,
and what on earth has this to do with atomic physics?

> the fields caused by the motions of the photons
> inside the atom

Huh?????

> are not correctly formulated point−charge
> to point−charge. The classical potentials cannot give us the
> correct answer, because the classical field theory as we have
> long known is wrong.

Duh. That's why we have QED now!

> The potential solution was in a sense
> chasing its tail; the classical fields and potentials are
> incorrect over atomic dimensions as Heisenberg had correctly
> determined.

A misrepresentation of what Heisenberg actually said.

> Coulomb's, and Biot's and
> Savart's famous E− and H−field forms apply to macroscopic
> phenomena not to atomic systems.

Unsupported assertion.

And I don't know what he means with "forms" here.

> The photons inside atoms in fact
> stream between electrons and nucleons. These photonic streams are
> not ubiquitous nor continuous, they are discrete and
> discontinuous.

This is not too much different from what QED says.

> They behave like Dirac delta functions
> <http://mathworld.wolfram.com/DeltaFunction.html>,

In what way do they "behave like Dirac delta functions"?

> an interesting
> fact in terms of their role in solving Maxwell's equations for
> self fields (see below on numerical methods FEM vs FDM).
>
> Another term needs clarification: spinor.

This term has a clear definition, so why does it need clarification?
Because Dr. Fleming does not like the definition and prefers to make up
his own, right?

> In Dirac's formulation
> the resulting complex matrices were capable of synthesis into
> various Dirac "bispinors".

Again, a *very* strange formulation.

> These are adjointly coupled 2 x 2
> 'unit' spinors (determinant = 1)

Huh??? A spinor does not have a determinant!

> that have a left− or
> right−handed helicity associated with them. In the chiral
> representation of Dirac's equation, the terms are 4 x 4 matrices
> comprised of Pauli spinors.

Balderdash. The spinors are 4−tuples, not 4 x 4 matrices!

> In SFT, the term 'spinor' is used for
> the motions of the E− and H−fields,

See? Exactly as I predicted.

As usual for cranks, he uses a well−defined term with a *complete* different, totally nonsensical meaning.

"motions of the E− and H−fields"? That makes no sense! Fields don't move!!! Again, he demonstrates that the does not know what "field" actually means in physics.

> and for the motions of the
> particles, such as the electron or proton. Everything in the
> mathematics of SFT, both particles and their (particulate)
> fields, move as rotating vectors;

Word salad.

> like QFT for the atom there are two spinors,
> or four variables per subatomic particle.

That has little to do with QFT.

> In the
> following, the terms 'wave equation' and 'vector and scalar
> potentials' are applied to all quantum field theories that follow
> the heritage of Dirac's wave equations up to and including
> today's standard model. In this aspect SFT is indeed the only
> true 'field' theory, not only because it uses the term 'field' in
> an historically correct sense

Balderdash.

> but further it applies these fields
> not between charge points, but (instantaneous) centres of motion.

Word salad.

> MATHEMATICS OF SFT AND QFT
>
> The mathematics of self−field theory (SFT) and quantum field

> theory (QFT) are very different.

Duh.

> In SFT the eigenvalue nature of
> the hydrogen atom system of equations fits the concept of a
> quantized physics; in QFT it is mandated apriori as part of
> quantum mechanics.

Word salad.

> Hence in SFT quantization is a consquence of
> the mathematics and in QFT it is an artifice, inserted by Planck
> to solve the analytic problem of blackbody radiation.

Plain utter *nonsense*. Quantization in QFT is *not* simply inserted artificially; it follows mathematically from the basic commutation relations.

> The fields
> in SFT are seen as streams of discrete photon interchanges
> between atomic sub−particles; in QFT the fields are considered
> continuous and ubiquitous, operating over all solid angles,
> similar to the classical fields of the macroscopic world
> discovered by Coulomb and Biot−Savart.

Actually, the QFT description is somehow intermediate between the QFT description he claims here and the SFT description he describes.

> Feynmann glimpsed the
> physics of the quantum world without realising the difficulties
> presented by the potential theory associated with the classical
> wave equations, the basis of the Standard Model. In today's QCD,
> the wave functions are modelled by lattices instead of continuous
> functions <http://en.wiki pedia.org/wiki/QCD_lattice_model>
> and so are discrete in a numerical sense.

Wow. What a nonsense. So he also has not the faintest clue of what lattice QCD actually is, and why and for what purposes it is actually used in many applications.

> But in its analytic
> eigenvalue solutions to the hydrogen atom, SFT provides a natural
> basis for quantum physics. Differences between SFT and QFT are
> fundamental as to how we view quantum physics; either as a
> 'strange, bizarre' world at the tiny atomic and nuclear

> dimensions, or a natural view fitting the long−term mathematical
> framework built up over preceding centuries and millenia
> <http://www−groups.dcs st−and.ac.uk/~history/HistT
> opics/Matrices_and_determinants.html>. The Sturm−Liouville
> problem
> <http://www−groups.dcs.st−and.ac.uk/~history/Mathematicians/Sturm.html>,
> an eigenvalue problem in 2nd order odes, was solved in 1836−37.

And the relevance of that is precisely what?

[snip a bit]

> The major difference between these analytic formulations lies in
> the integrals associated with the scalar and vector potentials of
> QFT

Huh? What integrals is he talking about?

> compared with the direct substitution for the E− and H−field
> forms into the partial differential equations by SFT. In QFT we
> do in fact require some form of numerical method to solve the
> wave equations.

In QFT, no wave equations are solved in general. What is he talking about?

> The
> analytic difficulties of the wave equation are exacerbated by the
> second order of the two wave equations and their associated gauge
> conditions compared with the four first order Maxwell equations.
>
> Of course the self−field solution has only been available for the
> past few years.

Well, if it existed for several years already, why has no physicist accepted it in the meantime? Why wasn't this big news?

> The vector and scalar potential solution
> incoprorated inside quantum mechanics was the only method known
> to solve non−radiating atomic systems. The self−field requires
> the special boundary condition that it be confined within a
> finite region of space without radiation out to infinity.

What is "it" here?

> This is
> not a closed or bounded problem such as a waveguide. Rather it is
> an open problem, akin to a non−radiating antenna, somewhat a
> semantic tortology. Yet there is such an antenna. We can arrange
> for the (two) feeds on an antenna to provide no net radiation.
> It isn't very practical in terms of radiation, but it may well be
> of practical use as a means of preventing radiation leaking into
> regions where it is not desired. Thus the groups known as SU(2)
> and SU(3) and their space−time inverses re candidate solution
> forms for the self−fields due to wave equations and
> 'Maxwell−like' equations.

Totally nonsensical word salad.

What on earth is "their space−time inverses" supposed to mean?

And what on earth do these groups have to do with "preventing radiation"???

> Such forms are well known to
> mathematicians, scientists, and engineers seeking general
> solutions to sets of homogeneous partial differential equations
> <http://kr.cs.ait.ac.th/~radok/math/mat10/start.htm>.

Again: "forms"?

> As we
> should expect, the spinors of SFT are closely related to the
> groups within QCD, and QED. In fact apart from the fact that QCD
> and QED use such exponential forms

"exponential forms"???

> as unit 'bispinors' and 'trispinors',

???

Does he perhaps mean dublets and triplets???

> and have a variable magnitude within SFT,

?????

> there is
> no difference. We shall see that there is a family of
> 'Maxwell−like' equations for both electromagnetic (EM) and other
> fields that give rise to weak and strong nuclear forces.

He is free to explain all the available evidence for QCD and the electroweak force using these equations...

> The
> self−field solution is indeed a novel mathematical solution that
> allows 'dirac delta' particles to move in a field (consisting of
> tiny 'dirac delta' particles) such that they do not emit
> radiation (no photons escape into he outside world).

Then this "self−field solution" contradicts Maxwell's equations, although he claims it is based on them.

> In comparing the numbers of unknown variables in QFT and SFT, we
> first must specify the application. In atomic physics, there are
> in quantum electrodynamics (QED) the vector and scalar
> potentials, four per particle altogether.

Calling these "unknown variables" is yet again strange terminology. And why he thinks that these potentials have to be counted "per particle" is beyond me.

> In SFT after specifying the
> fields using the two divergence equations,

Huh? A divergence equation does not uniquely specify a field.

> the remaining two
> Maxwell curl equations provide only three scalar equations;

???

> we need a fourth equation per particle. This is supplied for the
> case of the atomic EM self−fields as a balance of the Lorentz
> forces between any two charged particles and this converts into a
> pair of virial equations where the magnetic and electric forces
> are in dynamic balance. Note that the four variables per particle
> within QED, the potential and vector potentials, require
> conversion to the E− and H−fields post−solution (Electromagnetic
> Analysis System EMAS

> <http://www.diel.univaq.it/research/?id_area=10 &id_subarea=43 >
> for example does this for the EM fields having solved for the
> potentials).

Word salad.

> In nuclear physics, the strong nuclear interaction requires the
> mathematics of QCD to solve for particle states.

Word salad. And yet again, he confuses QCD with the *nuclear* strong force.

> Like QED, the solution is given as a probability density.

Vaguely right.

> These solutions are governed by the uncertainty principle.

Vaguely right.

> We can view the
> uncertainty principle as nothing more than a criterion of
> accuracy due to the quantum mechanical method of solution and
> that classical fields are used at atomic dimensions.

Balderdash. He should read up on Bell's inequality.

> Part of the
> procedure of QFT is a 'coupling' of the centre−of−motion field
> variables that are decoupled in Maxwell's classical equations.

???

> This 'smears' the field solution; the centre−of−motion E− and
> H−fields being intertwined numerically.

Centre of motion of fields??? Utter nonsense.

> So with high−energy
> physics, as with QED, the probability densities are as good as we
> can get;

Wrong, we can get a lot more things.

> our 'observables' are unable to untangle the true atomic
> fields.

Balderdash.

> As with QED, the computations require lengthy 'random
> walk' simulations on large supercomputers.

In some applications, yes. In a lot of others, wrong.

> A discretized version
> of QCD suitable for numerical calculations is called Lattice QCD
> <h ttp://www.unifiedph
> ysics.com/The%20discretized%20version%20of%20QCD%20is%20called%20Lattice%20QCD.>.
> This lattice numerically seeks the energy profile that constrains
> our equations to obey the known laws governing them including
> gauge symmetries that apply.

Ouch. Yet again, a totally nonsensical formulation.

> "It took nearly a year to do the calculations, but when the
> computer finally disgorged the numbers, physicists had for the
> first time extracted from theory predictions of the ratios of the
> masses of eight subatomic particles. These computed,
> theoretically derived ratios differ from experimentally observed
> values by less than 6 percent." Ivars Peterson
> <http://www.encyclopedia.com/html/q1/quantumch.asp>

And how does Dr. Fleming explains this success, if QCD is wrong?

Is he able to do this, too? I sincerely doubt that.

> In SFT we do
> NOT assume anything apart from the spinorial (rotating vector)
> forms for the motion of the fields; the positions and velocities
> of the interacting photons also have the shape of a spinor
> (rotating vector). These periodically rotating fields are assumed
> since the solution must be a self−field and self−propagating.
> The fields in SFT cause the motions of the particles which in turn
> cause the field motions; any two particles and their interacting
> fields are thus joined 'at the hip' so to speak. The
> (mathematical) trick is to suggest a field form suitable for the
> observed forces.

Word salad.

> In strong nuclear SFT it is observed to be six
> variables or 'flavours' of quark: up, down, charm, strange, top
> and bottom; while the gluon fields have three 'colours': red,
> green, and blue.

Wow, what a nonsense. He is free to explain confinement, breaking of
Bjorken scaling, three−jet events etc. based on this.

> It is found that the six variables are
> consistent with there being three spinorial motions per
> sub−nuclear particle, and not two as with the EM forces, while
> there are now three types of interactions possible correlating to
> the two types of elemental charge, positive and negative,
> associated with the EM forces.

Word salad.

> DIRAC DELTA FUNCTIONS
>
> One final point: the mathematical procedures of SFT can be
> applied as a form of potential theory that incorporates the
> centre of motion fields; a modern form of quantum field theory
> that in principle goes 'beyond quantum'. As we already have a
> simpler solution procedure this method's day has not yet arrived,
> but indubitably it will come in due time.

Word salad.

Bye,
Bjoern

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- ***Follow−Ups***:
  - ***Re: why can't fields be quantized too?***
    - *From:* tfleming1
  - ***Re: why can't fields be quantized too?***
    - *From:* Schoenfeld

- ***References***:
  - ***why can't fields be quantized too?***
    - *From:* flames
  - ***Re: why can't fields be quantized too?***
    - *From:* Bjoern Feuerbacher

- ***Re: why can't fields be quantized too?***
  - *From:* flames


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