Re: why can't fields be quantized too?

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- *From*: "flames" <fleminginflames@xxxxxxxxx>
- *Date*: 23 Aug 2005 01:39:13 −0700

Bjoern Feuerbacher wrote:
> flames wrote:
> > Physics said the energy levels of fields are quantized
> > as in photons but the field itself is not quantized.
> > What would happen if you quantize the fields too?
>
> Please be specific. What exactly do you *mean* with "quantize
> the fields"?
>
> In fact, most physicists would argue that this *is* indeed done in
> Quantum Field Theory!
>
>
> Bye,
> Bjoern

A mathematical 'genius' called Dr. Fleming 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. 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. 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. It is instructive to survey the main equations used
by physic ists since Maxwell's equations
<http://scienceworld.wolfr am.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://hyp ertextbook.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.

Following theoretical and experimental demonstrations by Planck
and Einstein of the existence of a quantum physics, 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
in a variable called the wave function that accurately described
single−electron states such a s the hydrogen atom. The wave
function depended on a Hamiltonian function and the total energy
of an atomic system, and was compatible with Hertz's potential
formulation. 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>.

In 1928 Dirac realising the wave functions were not relativistic
sought a set of e quations incorporating Einstei n's relativity.
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'. 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. The problem was now 'wave−like'
instead of two uncluttered fields and Heisenbe rg 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. 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), any fields, macroscopic or atomic, were a long−forgotten
reality.

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? 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 form s are not applicable to sub−atomic charges. 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. 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; the fields caused by the motions of the p hotons inside the atom 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. 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. Reality wasn't in error; but classical field theory was and thus also quantum field theory. Coulomb's, and Biot's and Savart's famous E− and H−field forms apply to m acroscopic phenomena not to atomic systems. The photons inside atoms in fact stream between electrons and nucleons. These photonic streams are not ubiquitous nor continuous, they are discrete and discontinuous. They behave like Dirac delta functions <http://mathworld.wolfram.com/DeltaFunction.html>, 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. In Dirac's formulation the resulting complex matrices were capable of synthesis into various Dirac "bispinors". These are adjointly coupled 2 x 2 'unit' spinors (determinant = 1) 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. In SFT, the term 'spinor' is used for the motions of the E− and H−fields, 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; like QFT for the atom there are two spinors, or four variables per subatomic particle. 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 but further it applies these fields not between charge points, but (instantaneous) centres of motion.

MATHEMATICS OF SFT AND QFT

The mathematics of self−field theory (SFT) and quantum field theory (QFT) are very different. 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. 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. The fields in SFT are seen as streams of discrete photon interchanges between atomi c 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. 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. 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.

As stated <http://www.unifiedphysics.com/index.htm>, an analogy exists between QFT and SFT via two numerical techniques: the finite element method (FEM) <http://csep1.phy.ornl.gov/bf/node8.html> and finite difference method (FDM) <http://csep1.phy.ornl.gov/bf/node7.html>. While both are primarily numerica they contain the essence of an analytic comparison between QFT and SFT. Both are used to solving partial differential equations, such as the inhomogenous wave equation (1) <http://farside.ph.utexas.edu/tea ching/jk1/lectures/node19.html>, (2) <http://www.math.ohio−state.edu/~gerlach/math/BVtypset/node24.html> or Maxwell's equations for the self−fields <http://www.unifiedphysics.com/UP_EM_self_fields_all_in_one_revb_Nov_08_04.pdf>. The major difference between these analytic formulations lies in the integrals associated with the scalar and vector potentials of QFT compared with the direct substitution for the E− and H−field forms into the partial differential equa tions by SFT. In QFT we do in fact require some form of numerical method to solve the wave equations. In SFT the direct spinorial subsitution is suffice to produce a solvable system of equations; no numerical methods are necessary, only a system of spinorial equations needs to be solved via linear algebra techniques. Although the inhomogeneous wave equation appears to be a reduced set of equations compared with Maxwell's equations, two equations rather than four, the necessary constraints upon the gauge condition mean that the ve ctor substitutions in se tting up the potentials lead to complications later on in the analytic solution. 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. 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. 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 nett 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 are candidate solution forms for the self−fields due to wave equations and 'Maxwell−like' equations. Such forms are well known to mathematicians, sc ientists, and engineers seeking general solutions to sets of homogeneous partial differential equations <http://kr.cs.ait.ac.th/~radok/math/mat10/start.htm>. 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 as unit 'bispinors' and 'trispinors', 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. 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).

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. In SFT there are also four variables per particle, consisting of two spinors, a radius and a frequency for each spinor. In SFT after specifying the fields using the two divergence equations, 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).

In nuclear physics, the strong nuclear interaction requires the mathematics of QCD to solve for particle states. Like QED, the solution is given as a probability density. These solutions are governed by the uncertainty principle. 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. 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. So with high−energy physics, as with QED, the probability densities are as good as we can get; our 'observables' are unable to untangle the true atomic fields. As with QED, the computations require lengthy 'random walk' simulations on large supercomputers. 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.

"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> 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. 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. 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.

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.

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- ***Follow−Ups***:
  - ***Re: why can't fields be quantized too?***
    - *From:* Y.Porat
  - ***Re: why can't fields be quantized too?***
    - *From:* Bjoern Feuerbacher
  - ***Re: why can't fields be quantized too?***
    - *From:* feuerbac

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

- Prev by Date: ***Re: why can't fields be quantized too?***
- Next by Date: ***[More on: part 2] Explaining the photo electric effect from the wave perspective.***
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