Re: New Paper: Magnetic Monopoles and Duality Symmetry Breaking in Maxwell's Electrodynamics

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- *From*: "FrediFizzx" <fredifizzx@xxxxxxxxxxx>
- *Date*: Thu, 25 Aug 2005 23:06:42 −0700

"Jay R. Yablon" <jyablon@xxxxxxxxxxxx> wrote in message
news: U9Pe.36098$EX.35456@xxxxxxxxxxxxxxxxxxxxxxx
| Hello to all:
|
| I wanted to let you know about my new paper just posted at
| http://arxiv.org/abs/hep−ph/0508257, titled Magnetic Monopoles and
Duality
| Symmetry Breaking in Maxwell's Electrodynamics.
|
| This paper summarizes the main direction of my research over these
past
| eight months.
|
| The abstract is as follows:
|
| It is shown how to break the symmetry of a Lagrangian with duality
symmetry
| between electric and magnetic monopoles, so that at low energy,
electric
| monopole interactions continue to be observed but magnetic monopole
| interactions become very highly suppressed to the point of effectively
| vanishing. The "zero−charge" problem of source−free electrodynamics is
| solved by requiring invariance under continuous, local, duality
| transformations, while local duality symmetry combined with local
U(1)_EM
| gauge symmetry leads naturally and surprisingly to an SU(2)_D duality
gauge
| group.
|
| I would be interested in any feedback, public or private, that you may
wish
| to provide.
|
| Sincerely,
|
| Jay R. Yablon
| ________________________________
| Jay R. Yablon

| Email: jyablon@xxxxxxxxxxxx

Jay, what you wrote on the sp group in response to Dr. Photon was so
good I am going to just quote it here.

""Dr Photon" <brendan.roycroft@xxxxxxx> wrote in message
news:1124974077.970444.91480@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> Jay R. Yablon wrote:
> [read my paper]
>
> So if a Yablonon did exist at 2.35 TeV, what's the best way to go
about
> looking for it? Would it be straightforward? What signature/lifetime
> would it have? As it is so massive, would it have an incredibly short
> lifetime and so be v. hard to distinguish from noise?
>

Hi there Dr. Photon!

Let me approach this from two directions:

First, the final footnote on page 34 points out that if one takes the
main
results and applies them to weak and strong interactions (imposing a
Dirac
Quantization Condition (DQC) for *their* couplings), that the vector
bosons
which mediate magnetic monopole interactions for those interactions are
predicted to be around 436 GeV (strong, at pi/4 complexion) and about
1.3
TeV (weak, after adjusting running couplings for TeV range). There are
three mass events which seem to be causing a buzz out of the Tevatron:
1206
GeV, 1364 GeV, and 436 GeV. I suspect that the 1364 GeV and the 436 GeV
events may be the respective mediators of analogous magnetic monopole
interactions for weak and strong interactions, and so would look very,
very
closely at these events. The weak mediator, I think, would also show us
for
the first time the SU(2)R (right−handed) weak interactions which some
suspect exist at high energies, see next paragraph. (The reason these
masses are *smaller* than the 2.35 TeV mass from my paper, is because
they
are based on the inverses, via DQC, of weak and strong couplings which
are
larger than the EM coupling.)

Second, let me preview the next paper I will prepare (after a bit of a
break
following eight months working toward this paper), which picks up from
where

this one left off, to explore the SU(2) duality group that was a
"surprise"
in section 7. If one starts with SU(2)_D and looks closely at the
magnetic
monopoles themselves as fermions, it turns out that these are *not*
wholly
independent of electric charges, and that chirality is the key to tying
these together (the electroweak analogy therefore goes even deeper). In
fact, the next "surprise" we will come upon is that the magnetic
monopoles
are actually the left−handed chiral projections of the electric charges.
More to the point, in the "unbroken" Lagrangian the "electric" charges
are
all right−handed and the magnetic charges are all left−handed, and this
type
of chiral separation before symmetry breaking applies to the Lagrangian
for
any interaction, not just U(1))_em. But, when we add their currents
as in
(5.11), J^u' = J^u + P^u, the observed electric charge currents J^u'
turn
out to be chiral symmetric, as is observed. So, the brief answer to
your
question about "signature" (the full answer will need about a 20 page
paper), is to take equation (5.14) and look at what it would tell us if
J^u'
is taken to be chiral symmetric and P^u is taken to be all left−handed.
In
this case, since the complexion alpha is very small (sin^2 alpha = 2.131
x
10^−4, see (6.7)), we would find that the observed magnetic monopole
current
P^u' couples with a very heavy weighting toward left−handedness. (BTW,
it
could be exactly the opposite −− equally heavy right−handed weighting −−
the
theory does not (yet) tell us which way to make the L, R assignments).
So,
look for a magnetic monopole interaction that couples to *known*
electric
charges (rather than some new independent fermions) with a very heavy
(but
not 100% like weak interactions) weighting based on the square of the
fine
structure coupling (accounting for Dirac's 1/2 factor).

So, if someone were to say "I found some weird vector boson near 2.3 or
2.4
TeV that couples the electrons or the quarks with a very heavy left (or
right) handed bias on the order of 10^4," I would say "Bingo!"

The even deeper upshot, is that in the *unbroken* Lagrangian, left− and
right−handed chiral projections are separate, and then they become
combined
through equations like (5.11). This will help us to understand why the
weak
interactions at low energies are strictly left handed (we are dealing
with a
symmetry unbroken by a (5.11)−type condition). And, remember, left and
right handed Fermions, as two−component Dirac spinors, are massless. It
is
only when we combine them to form a four−component spinor, that they
gain
mass. Just like adding a third polarization using Goldstone scalars
gives
mass to vector bosons. So, there is a very deep mass connection that
emerges here as well.

Now maybe I don't have to write the next paper. But, I suspect people
will
want to see the details."

What do you think of Dr. Photon's Yablonon? LOL!

FrediFizzx

http://www.vacuum−physics.com/QVC/quantum_vacuum_charge.pdf
or postscript
http://www.vacuum−physics.com/QVC/quantum_vacuum_charge.ps

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- ***References***:
  - ***New Paper: Magnetic Monopoles and Duality Symmetry Breaking in Maxwell's Electrodynamics***
    - *From:* Jay R. Yablon

- Prev by Date: ***Re: relationship between the law of large numbers and entropy***
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