Re: How real are the "Virtual" partticles?

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From: Arnold Neumaier (*Arnold.Neumaier_at_univie.ac.at*)
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Eugene Stefanovich wrote:

> Arnold Neumaier wrote:
>
>>Eugene Stefanovich wrote:

>>>So, loosely speeking, in QED real electron = bare electron + coat of
>>>virtual particles.
>>
>>Not 'in QED' but only 'in standard perturbative QED'.
>>One can do QED in many ways, and depending on how it is done,
>>what is virtual is very different. In NRQED, which is the version
>>of QED used for high agguracy calculations of the Lamb shift
>>(and hence responsible for the supreme trust in QED),
>>there are no virtual particles at all.
>
> How can it be so?

Because there are many ways to extract physics from QED,
not only standard perturbation theory. People working on QED
are not as stupid as your claims suggest.

One can compute everything of interest from current QED
if one puts in the effort, and only some of the computational
techniques use virtual particles.

What about trying to predict the color of gold in your formalism?
One can do it from standard QED, using a series of approximations.
If your approach is superior, show it on something challenging!

From what I read about NRQED, its Hamiltonian
> contains trilinear terms, like a^+c^+a. This means that if you
> prepare a state of one electron a^+|0> at time=0, then after a
> short time, this state will evolve into exp(iHt)a^+|0> which
> is an infinite linear combination of multiparticle states.

Nobody is interested in exp(iHt)a^+|0> since the bare vacuum |0>
is not a physical state. Nobody is so stupid to try to compute this.

What is related to measurable quantities are matrix elements
of a form such as
<vac|exp(iHt_0) f_1 exp(iHt_1) f_2 exp(iHt_2)|vac>
where t_0+t_1+t_2 = 0,
f_1, f_2 are components of physical currents, say,
and |vac> is the physical vacuum. And these have finite limits.

Arnold Neumaier