

Re: Another EPR question

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From: Bilge (*dubious_at_radioactivex.lebesque-al.net*)

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Caroline Thompson:

>Bilge:

>>

>> *Since it's impossible to close every possible loophole in any
>> theory, the correct question is ``are we to accept [quantum
>> mechanics] just because it predicts the correct results and no
>> one has offered another theory which agrees with the experimental
>> data and explains something that [quantum mechanics] doesn't?"*

>>

>> *The answer, of course, is ``yes."*

>

>*Or rather, "No", since*

Only by those who object based on philosophical bias, but who have not made any real attempt to construct an alternative theory which actually generates real numbers to compare with experimental data. Since nature has probably not consulted with you on how to run the universe, your philosophical objections carry no weight. Of course, if you could provide a note from nature that I could authenticate regarding that consultation or a theory which is better than quantum mechanics I'll reconsider. By "better", I mean reproduces every result with which experiments are known to agree with quantum mechanics as well as predict something which is contrary to a quantum mechanical prediction which would constitute a test to choose between your theory and quantum mechanics. That is how science works and how science has always worked since the scientific method replaced the decrees of the pope.

>(a) *in view of the loopholes in the Bell tests, there is as yet no proof*

>*that QM really does predict the correct results (see Santos' recent*

>*conclusion:*

>*"the validity of local realism may be either refuted by a single*

>*loophole-free experiment or increasingly confirmed by the passage of time*

>*without [a successful loophole-free] experiment. "*

><http://arxiv.org/abs/quant-ph/0410193>, and

>

>(b) *those same loopholes mean that there *are* other theories that can*

>*predict the same results. [See*

>http://en.wikipedia.org/wiki/Local_hidden_variable_theory. Similar theory
>can, incidentally, explain a great many other experiments in quantum
>optics.]

>

>> Classical mechanics was accepted for a long time, based on exactly the
>> same line of reasoning. If I employ your reasoning regarding loopholes,
>> then for centuries, physicists, engineers, etc., were engaged in an
>> elaborate fraud. Anyone with a fertile imagination and a resistance to
>> logic can come up with an example of an experiment that has never
>> literally been performed to test classical mechanics and declare it a
>> loophole in newton's laws.

>

>Come on now, Bilge! The two are scarcely in the same category!

I agree. Quantum mechanics not only encompasses newtonian mechanics,
but explains many phenomena for which newtonian mechanics fails. So,
rather than have two theories, I only need quantum mechanics.

>There are no obvious phenomena that refute Newton's Law, whereas
>every day, in every walk of ordinary life as well as every science,
>we take it for granted that there are no "nonlocal" effects (in the
>Bell sense.

There are lots of such phenom, the most obvious being the stability
of matter. Last time I checked, matter was fairly stable using the
time scale of "every day" as a figure of merit. Right off the bat,
you'll note that there is no atomic ground state one can obtain from
newtonian mechanics. Even more bewildering without quantum theory would
be the fact that accelerated charges are known to radiate (which is
evident by the existence of radios and televisions), which from newtonian
mechanics, one would deduce the electron will spiral into the nucleus
on a time scale a lot shorter than a day. By any chance do you have
a theory that quantizes the energy levels in atoms using newtonian
mechanics? My guess is, no.

>Of course there are nonlocal effects all over the place in the sense
>of everything being affected by the environment.). Everything we have
>ever encountered in our lives refutes the possibility of nonlocal effects.

The environment is not a non-local effect. I obviously cannot respond to
your post until you post it and it propagates to me, which in principle
can occur faster than usually occurs with the implementaiton of the news
protocol, but is still limited by relativity.

>> > A loophole-free one has yet to be performed.

>>

>> That is true for any theory of anything that has ever been proposed.

>> Physicists just tend to accept the theories which haven't yet been

>> falsified.

>

>Hmmm ... but, as I said, nonlocality is refuted by everything else in the

>world. *Quantum entanglement is supposed to be the one exception. I think
>we are entitled to expect extraordinary evidence.*

I think you need to review what the meaning of the terms in your argument and try to come up with an argument that argues against the theories to which you allude. It's easy to misconstrue a theory to fit your argument. It's a bit more difficult to actually take the theory in question and create a real objection. As far as "extraordinary evidence" goes, there exists a great deal of it. So much in fact, that it stopped being anything but ordinary a long time ago.