

Re: attractive force via particle exchange – how?

Source: <http://sci.tech–archive.net/Archive/sci.physics/2005–08/msg02223.html>

- *From:* Mitchell Jones <mjones@xxxxxxxxxxxxxxxx>
 - *Date:* 16 Aug 2005 07:14:24 EDT
-

In article <ddl255\$bf1\$1@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>, glhansen@xxxxxxxxxxxxxxxxxxxxxxxx (Gregory L. Hansen) wrote:

> In article <mjones–3E63CC.01391913082005@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
> Mitchell Jones <mjones@xxxxxxxxxxxxxxxx> wrote:
>> In article <ddd7a5\$R5a\$2@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
>> glhansen@xxxxxxxxxxxxxxxxxxxxxxxx (Gregory L. Hansen) wrote:
>
>>>
>>> The *field* causes an attractive force.
>>
>>***{ "The field" is just a label asserting that the particle behaves the
>>way the equation says it behaves. It causes nothing, hence explains
>>nothing, because it adds nothing. You might as well tell us that the
>>equation causes the behavior of the particle, as to tell us that "the
>>field" causes it. --MJ}***
> ...
>>
>>***{No, it isn't "as if" a particle carried the force across the
>>intervening space. The reality is that we know for a fact, in all cases
>>whatsoever in which a force is delivered to a target, that an entity was
>>the carrier of the force. We know that because the alternative to the
>
> You have it backwards. The particle is an interpretation of the field.

***{No, I don't have it backwards. When I speak of fields, I recognize that continuum mathematics is an approximation that breaks down when the scale is small enough, and that the actual force carriers are discrete, not continuous. That means, for example, that a charged particle moving through a magnetic field experiences a series of discrete bumps as it is deflected from individual flux lines, and that it does not change its direction in a smooth curve. Thus I did not disagree when you said:

"...in some time interval you may or may not get some momentum $p=h/\lambda$ transferred."

And I did not disagree when you said:

"...the momentum transfer is sudden and finite."

Re: attractive force via particle exchange – how?

My point of disagreement came when you said:

"It is *as if* a little billiard ball knocked into a particle..."

Your use of "as if" in the above suggests that explaining "sudden and finite" momentum transfers by postulating impacts with unseen particles ("little billiard balls") is a mere metaphor, rather than an accurate description of the essence of what is going on. Indeed, in your very next sentence you stated quite explicitly your belief that the particulate description is merely "a metaphor for something that the field did."

Therefore I must repeat myself: no, it isn't "as if" a particle carried the force across the intervening space. The reality is that we know for a fact, in all cases whatsoever in which a force is delivered to a target, that an entity was the carrier of the force. We know that because the alternative to the notion that forces are carried by entities is the notion that they leap into existence out of nothing, or that they are carried by "force fields," which is just an empty label saying the same thing. The key insight is that either something—some thing, meaning an entity/particle—is there to deliver the force to its recipient, or nothing—no thing, meaning no entity/particle—is there. If you insist that no thing is there and yet the force gets exerted anyway, you are proclaiming a belief in magic, plain and simple. And saying a "field" is there, meaning a ghostly presence that it isn't an entity and isn't composed of entities, is just a convoluted way of saying, again, that the force came from nothing.

If you disagree with the above, please insert your reasons at the appropriate locations.

—Mitchell Jones}***

- > A photon is an excitation of the electromagnetic field just as the
- > electron is an excitation of the Dirac field. And the particle
- > interpretation isn't universally valid

***{I have already responded to your claim that forces need not be carried by entities and that the postulation of such entities is mere metaphor. You snipped out the response, and, above, merely repeated the assertion in a slightly different form. But that is not dialogue. If you intend to engage in dialogue, you should respond to my response, rather than merely repeating that to which I responded in the first place. To assist you in that endeavor, here, between the lines of asterisks, is my response again.

All forces are carried by entities. Period. It has to be that way, because any other concept destroys the very foundations on which science, and, indeed, all knowledge, rests.

Re: attractive force via particle exchange – how?

Re: attractive force via particle exchange – how?

Why so? Simple: if forces do not need to be carried by entities, then we cannot infer the presence of entities when forces are exerted. If a photon exerts a force on the retina, we cannot infer the existence of the photon. The photon need not have existed at all. Thus if we think we are doing an experiment, based on seeing it before us, we have no basis for such a conclusion: the forces that were exerted on the retina do not imply that entities (photons), impinged on the retina, or that, before reaching the retina, the photons bounced off of experimental apparatus, because in neither case were entities required to exert force. Therefore if forces need not be carried by entities, then we lose all basis for the inference from sensation to source—which means: we have no basis for believing in the existence of any entity, a conclusion which specifically includes our own physical bodies, those of other people, and, indeed, everything else in the material universe.

Bottom line: if forces need not be carried by entities, then we have no basis for belief in the existence of anything, including ourselves.

If you have any substantive disagreements with the above, please insert them at the appropriate locations.

—Mitchell Jones}***

> ; it breaks down in extreme

> spacetimes. It is the field, not the particle, that is fundamental

***{"Reality" is an ideal that can never be completely grasped by the human mind. That means "the field" as defined by "field equations," is a mere approximation of the underlying reality—an approximation that breaks down when the scale becomes small enough. The reason it breaks down is that the underlying reality is discrete, and the behaviors which we attribute to "the field" arise out of interactions with lesser entities—entities which, for the most part, we have not yet identified, and which operate according to principles that we have not yet grasped.

The alternative to the above conception of fields, as I have already pointed out in some detail, would be that they work by means of magic—i.e., that when a particle at a specific location within the field changes its state of motion, it is not responding to a collision with anything, because nothing else is there. In effect, the force leaps into existence out of nothing.

As I explained, the notion of forces leaping into existence out of nothing rips the foundation from beneath the structure of human knowledge, leaving us with no rational basis for belief in the existence of anything, including ourselves. If you disagree, I await your reasons (but I am not holding my breath :-).

—Mitchell Jones}***

Re: attractive force via particle exchange – how?

Re: attractive force via particle exchange – how?

> --

> quantum field theory is a theory of fields, and the notion of a particle
> is never actually required.

{It is required for the reasons that I stated in prior posts and have repeated above. If you have any response to those arguments, I'm all ears. --MJ}

> >nothing--no thing, meaning no entity/particle--is there. If you insist
> >that no thing is there and yet the force gets exerted anyway, you are
> >proclaiming a belief in magic, plain and simple. And saying a "field" is
> >there, meaning a ghostly presence that it isn't an entity and isn't
> >composed of entities, is just a convoluted way of saying, again, that
> >the force came from nothing. --MJ}***

>

> "Quantum mechanics is the dreams that stuff is made of."

{I repeat: the notion that forces need not be carried by entities collapses the entire structure of knowledge--i.e., the structure of reason-based belief--as explained above. If you allege that "quantum mechanics," or any other interpretive framework, requires such a notion, then you are alleging that the framework in question has no basis in reason, and, thus, is not science. --MJ}

> >> The

> >> virtual particle is a metaphor for something that the field did. And even
> >> static fields are a sum of wavelengths, so it applies to them, too.

> >

> >***{All forces are carried by entities. Period. It has to be that way,
> >because any other concept destroys the very foundations on which
> >science, and, indeed, all knowledge, rests.

> >

> >Why so? Simple: if forces do not need to be carried by entities, then we
> >cannot infer the presence of entities when forces are exerted. If a
> >photon exerts a force on the retina, we cannot infer the existence of
> >the photon. The photon need not have existed at all. Thus if we think we

> ...

> >Bottom line: if forces need not be carried by entities, then we have no
> >basis for belief in the existence of anything, including ourselves.

>

> There is no point of confusion if one hasn't first defined the field as
> non-existent

{It is you, not I, who has "defined the field as non-existent." You did that when you denied, by treating as mere metaphor, the notion that the forces exerted within the field are carried by particles. By such comments you have reduced "the field" to a ghostly presence without internal structure--which means: a mere label attached to the mathematical description, a label that adds nothing and explains nothing. --MJ}

Re: attractive force via particle exchange – how?

Re: attractive force via particle exchange – how?

> --- the electromagnetic field exerted a force on the retina.

{If a man wading into the surf was knocked over by a wave, would you say "The ocean knocked him down"? Of course not. You would say the wave knocked him down. ---MJ}

> The field is an entity, and we call that transfer of momentum a photon.

{Would you say, when the man is knocked down by the surf, that "we call that transfer of momentum a wave"? Again, of course not. The wave is the entity that carried the momentum, which was transferred to the man by exertion of a force. And, by the same token, the photon is the entity that carried the momentum which was transferred to the retina by exertion of a force. The wave is not the same as the momentum it transferred; and the photon is not the same as the momentum it transferred either. It is reasonable to say that entities carry momentum and transfer it by the exertion of force; but it is **not** reasonable to say that entities **are** momentum, or that they **are** force. Force and momentum are attributes, not entities. ---MJ}

> It's worth pointing out that particles in quantum mechanics don't act like
> little localized billiard balls flying around, anyway.

{The term "billiard ball causality" is not intended to convey the idea that all particles have the properties of billiard balls, but rather to convey that complex phenomena may be lucidly explained by identifying the particles which are interacting and the principles by which they operate, just as the behavior of billiard balls is well known to have been lucidly explained in precisely that manner. ---MJ}

> You might think of
> photons as little billiard balls

{I don't, though in many circumstances (e.g., the Compton effect) they behave similarly. Structurally, however, they are quite different from billiard balls. ---MJ}

> , but that would be a redefinition of the
> term. The photon is to the electromagnetic field what the phonon is to a
> crystal.

{When forces are exerted within "the field," are they always and necessarily exerted by entities, or not? (Your grade will depend on your answer. :-) ---MJ}

.

• *Follow-Ups:*

◆ *Re: attractive force via particle exchange – how?*

Re: attractive force via particle exchange – how?

Re: attractive force via particle exchange – how?

◇ *From:* Gregory L. Hansen

◆ ***Re: attractive force via particle exchange – how?***

◇ *From:* PD

• **References:**

◆ ***attractive force via particle exchange – how?***

◇ *From:* shevek4@xxxxxxxxxx

◆ ***Re: attractive force via particle exchange – how?***

◇ *From:* Gregory L. Hansen

◆ ***Re: attractive force via particle exchange – how?***

◇ *From:* Mitchell Jones

◆ ***Re: attractive force via particle exchange – how?***

◇ *From:* Gregory L. Hansen

• Prev by Date: ***250 miles per gallon ,why Bush sets on hydrogen***

• Next by Date: ***IONS FEEL THE FIELD EFFECT***

• Previous by thread: ***Re: attractive force via particle exchange – how?***

• Next by thread: ***Re: attractive force via particle exchange – how?***

• Index(es):

◆ ***Date***

◆ ***Thread***