

Re: Photons

You are describing mathematically what a field is not its physical nature. For example each point in an electrostatic field is defined by an amplitude (or intensity) and a direction, and is governed by the inverse square law. If a charge were placed at a specific point in that field our knowledge of the field will allow us to predict the force acting on that charge and the direction.

That is perfectly consistent with both of my physical descriptions of what a field might be which the maths is describing. One is that it is a physical stress in a physical aether as per Maxwell.

The other I suggested, a field consistent with there being no aether is that we simply accept that all force ultimately acts at-a-distance. Our problem is that our world appears to be solid and if something moves it is because some 'connecting rod' has made it move. We therefore look for the 'connecting rod' which makes one charge move another and we invented the aether to make the physical link we envisaged as being necessary.

What physics now teaches us is that even things we consider as solid are mainly empty space and it is a misconception to believe that a 'solid' hammer hits a 'solid' nail and drives it into the wood. Physics tells us that when the atoms of the hammer come close to the atoms of the nail (what we see as hitting it) the action at a distance force of repulsion between the two sets of atoms drives the nail in. i.e. all force acts 'at a distance' not merely the forces which early physics were aware did.

My second suggestion therefore was that a 'field' simply maps the field of influence of the action at a distance force.

The difference is important in that while a physical stress in the aether is real and physical, a field which is simply mapping the action at a distance force which WOULD occur IF a unit charge were placed at a point is a metaphysical field. Where as a physical stress can propagate and carry energy with it a metaphysical field is solely dependent upon the existence of whatever it is, the potential influence of which is being mapped. You may be able to suggest a 3rd alternative but I have not come across one.

This is where Tom's description of a photon falls down. My non aether field mapping action at a distance force isn't physical so cannot store physical energy and cannot exist in the absence of something (in this case moving charge) to provide the action at a distance force the field is mapping. Put simply, unless you or Tom can come up with a third physical description (not a mathematical description) of what a field is my two options are that either a photon contains massless charge which is responsible for the action at a distance field or there is an aether and a photon is a dynamic stress pattern in that aether.

The sort of answer I expect is 'who cares? Physics is about predictions and mathematics. Physical description is no longer an essential part of physics". I don't agree with that view point. Even if it were valid physics is inconsistent in that it says "there is no aether". i.e. It makes pronouncements of a physical nature and therefore makes itself answerable at the physical level. If physics says "there is no aether" then it has to be prepared to say what physically a field is if it is not a stress in the aether. If physics decides that it is simply a branch of mathematics where having a mathematical model which gives accurate predictions is all that counts it has no business saying there is no aether as it has put such matters beyond its remit.

If it is a 4-vector field,
there are four values associated with each point in spacetime. More than one field can apply at each point in spacetime. Laws of physics tell you how something about how the values of a particular field can vary from point to point. For example, the mathematical divergence (which tells you something about how the values of the field can

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change from point to point) of the vector magnetic field must always be zero, even though there are many configurations of the magnetic field that will satisfy this rule. The divergence of the electric field, on the other hand, does not have to obey this rule, and it obeys a different rule instead. It is also true that if a particle with certain properties inhabits a point where there is a field, then the behavior of that particle will depend on the value(s) of the field at that point.

That's what a field is, for starters. At least that what it's understood to be today, as opposed to 150 years ago.

Anything further read into it -- for example, that the value of the field tells you something about a stress or distortion in some "stuff" at that location -- is usually unwarranted.

It depends whether you consider physics to be simply a branch of mathematics or whether it should try to understand physical processes.

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John Kennaugh

"The nature of the physicists' default was their failure to insist sufficiently strongly on the physical reality of the physical world." Dr Scott Murray

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