Neutrinos as vacuum fluctuation particle pairs

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Abstract
Neutrinos have long been a scientific puzzle. They are small neutral particles that primarily take part in weak interactions. They were invented to explain the energy and momentum inequalities measured during beta decay, and yet they cannot be seen directly. The author has shown previously that beta decay can be described as a Hawking radiation type interaction where an antiparticle from a virtual particle pair is captured via annihilation allowing the matter particle of the virtual pair to become free. [1] The vacuum fluctuation particle pair takes the place of the neutrino in the decay equation. This opens up the intriguing possibility that neutrinos are more properly described as vacuum fluctuation particle pairs.

Introduction
Beta decay cannot be accounted for within the scope of classical electromagnetic theory, as there is a need for something to account for the range of measured energies. In 1930 Wolfgang Pauli sent a letter to some colleagues speculating that an electrically neutral particle could take away the remainder of the energy. This led to the neutrino theory, which was soon formulated in much greater detail by Enrico Fermi.[2] Beta decay was then grouped with similar interactions into a theory of weak interactions.

The greater problem with beta decay is that the emitted particle has a broad range of possible energies rather than a single energy at the maximum. Something had to account for the missing energy between what was measured and the total energy required for the decay interaction to occur. A neutrino is thought to be emitted carrying away that difference in energy; however, those neutrinos are very difficult to detect. In other interactions a neutrino is captured leading to decay. This implies that there is a field of neutrinos to be captured. It also implies that this field of neutrinos covers a continuous spectrum of energies. Then there has to be a probability function that governs the interaction yielding the shape of the energy curve.

In the Hawking interaction model weak interactions can be simply explained with neutron decay being a basic example. A free neutron which was made from a free proton and free electron a few minutes previously has a virtual electron-positron pair appear next to it. If the positron gets too close to the neutron it will annihilate with the electron-like component of the neutron leaving behind a free proton. The once virtual electron becomes free and carries away the excess energy of the reaction. Note that this interaction also works if mediated by a virtual proton-antiproton pair. All weak interactions can be similarly described as a Hawking interaction involving a virtual particle pair.

In the Hawking interaction model the vacuum fluctuation provides the initial energy rather than a neutrino. The field of vacuum fluctuations, the zero-point field, provides the range of energies needed to explain the range of energies of the freed electron. There is also a probability function governing the probability that a positron from a virtual positron pair will be captured leading to decay when the electron is freed.

Discussion

Neutrinos and vacuum fluctuation particle pairs can both explain weak interactions. Both are electrically neutral, with one being a dipole. They are both small and act over a short range given the energies involved. Neither is directly detectable. They are both known to go through regular matter without interacting. So, in many fundamental ways they are a similar.

There are some other ways where they differ. Neutrinos are spin ½ particles, while a vacuum fluctuation particle pair has spin 1 with the spin of the two component particles added. In the neutrino theory of decay spin is conserved in an interaction. In the Hawking interaction model it is not. It is important to remember that spin is not a physical property, so we do not know what it represents and have no physical bases for it being conserved. It is just a convention that works within the current system.

Lepton conservation creates a similar problem. But again there is no physical basis for lepton conservation, only an observation that it works within the scope of the current model. One could say, however with respect to beta decay, that a neutron is a combination of a proton with an electron, which is after all how it is formed. When thought of that way there is indeed an electron on both sides of the neutron decay equation.

There are three types of neutrinos, the electron, mu and tau types. Those neutrinos correspond with the equivalent particle pairs electron-positron, mu-antimu, and tau-antitau. The neutrino types can convert to one another, while any of the above vacuum fluctuations also may convert or simply be present at the same time. The vacuum fluctuation model has the advantage of having additional particle pairs such as proton-antiproton. One of the deficiencies with the neutrino model is if all interactions are due to the same particle then why are there different decay paths for some elements. Having additional particle pairs allows the Hawking interaction model to more easily fit the data.

The violation of symmetry with the weak force is also of interest. In this case the Hawking interaction model offers a simpler explanation of spin parity as a vacuum fluctuation particle pair has opposing spins so those spin relationships will be favored. One particle in a pair will be left-handed and the other right-handed, so interactions with those mirrored particle types will naturally be favored. The weak parity violation would then indicate that all vacuum fluctuations have the same handedness, which could also be the underlying cause for matter dominating the universe.

The Hawking interaction mechanism also explains the existence of a field of particles in a much more elegant way as the vacuum fluctuation model is consistent with the existence of a field spanning a continuum of energies throughout the vacuum. There is no fundamental model explaining how and why a field of neutrinos would have a continuum of energies, as is needed in the case of a neutrino initiated event. The randomness of the energy distribution of vacuum fluctuations also is consistent with the probability distribution of energies of the decay products.

The Hawking interaction has additional advantages over neutrinos in that it can be used to explain, quantum jumps, quantum tunneling, and electron orbital transitions, in a far more elegant way than other models.

Neutrinos have been experimentally detected, but have they really? Neutrinos are not detected directly but through a beta decay event thought to be initiated by neutrino capture. There is no way, however, to distinguish an event initiated by a neutrino versus one initiated by a vacuum fluctuation and vacuum fluctuations are everywhere. Neutrino detection experiments are not a deciding factor.

Conclusion

The two best arguments in favor of neutrino theory are spin and lepton conservation and neither of those have a physical basis for being true. We can even arbitrarily redefine parameters to keep them true if we like. Experimental detection of neutrinos is also not a deciding factor.

The arguments in favor of vacuum fluctuations are much stronger as they have a stronger fundamental basis for being present in a field exhibiting a continuum of energies. Hawking interactions can also solve other basic physics problems left unresolved by neutrino theory. We must also consider that it is highly unlikely that both are true and causing the same types of interactions. Given a choice vacuum fluctuations have a stronger fundamental basis based on Max Planck's quantum harmonic oscillators.

It is also good to remember that neutrino theory originated as a hypothetical used to fill a gap in an interaction. It was a placeholder. Over time the theory developed and the placeholder idea was lost. The fact that it took so long to come up with a better physical description is a testament to lack of research into the nature of vacuum fluctuations. It is clear now that neutrinos were nothing more than vacuum fluctuation particle pairs all along.

[1] R. Fleming, "Beta decay as a virtual particle interaction analogous to Hawking radiation" http://vixra.org/pdf/1204.0050v1.pdf (2012).
[2] E. Fermi, Z. Physik 88 161 (1934).