

# Re: Field Quanta

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- *From:* Igor Khavkine <[igor.kh@xxxxxxxxxx](mailto:igor.kh@xxxxxxxxxx)>
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On 2007-02-08, Oh No <[NotI@xx](mailto:NotI@xx)> wrote:

Thus spake Arnold Neumaier <[Arnold.Neumaier@xxxxxxxxxx](mailto:Arnold.Neumaier@xxxxxxxxxx)>

[...] Exchange particles are "virtual particles"  
– as the name says, purely fictitious objects –, introduced solely  
to let the complicated multidimensional integrals arising in quantum  
field theory (and abbreviated by Feynman diagrams) look somewhat  
tangible. See the entry "How real are 'virtual particles'?"  
in my theoretical physics FAQ at  
<http://www.mat.univie.ac.at/~neum/physics-faq.txt>

Thus any 'explanations' of what virtual particles do is meaningless.  
You could as well ask how the person (virtual image) in the mirror  
you are looking manages to move its hand when you lift your hand.

This is often asserted as though a definite fact, but it is actually  
just a point of view, one to which Feynman himself did not subscribe. He  
considered that we should not distinguish between real and virtual  
particles.

There are many points of view and yours maybe one of them, Feynman's may  
be another, and mine a third. All of these points of view may be equally  
valid and allowed to disagree when discussing physics informally.

However, the same can no longer be said when we leave the informal realm  
in favor of the quantitative and scientific one. Then, a physicist, that  
considers the question "What is a virtual particle?" in earnest, will  
not be able to find a definition that satisfies what is usually mean by  
both "virtual" and "particle".

The only definition that I know of that most can agree on is: a "virtual  
particle" is an internal line on in a Feynman diagram. Since Feynman  
diagrams only lives on paper, then so do virtual particles. A  
quantitative treatment of these wiggly lines on paper as "particles" is

truly impossible.

Igor

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