

Reading and listening

Since our class was cancelled and I will be away at a conference the week of Feb 2-6, here are some activities to bridge the gap until the next class. I had planned to complete the development of idea of a quantum field in class, and then have the independent activities be related to review and consolidation. It is a bit more challenging to have some of the fundamental development done by the video class, but we will try.

Video class:

I have prepared about a class worth of material in the video format, and it will be posted. Your assignment is to watch these videos as if you were in class, and prepare at least two questions to ask at the start of the next class.

Details:

There will be three new videos posted. One is a class length video which completes the development of the quantum field – it is called Basics 2. Everyone should watch this one. The other two are very short ones on the use of natural units ($\hbar = 1$ and $c=1$) and on 4-vector notation. These are optional – if you are comfortable with these topics you can skip them. They will be posted on SPARK and also on Screencast, with the link being found in the Teaching section of my blog. (And the blog can be found from my departmental home page or at <http://blogs.umass.edu/donoghue/category/teaching/> .) Please also take the opportunity to do some review of the background material (see below). We will start off the next class (Tues Feb 10) with a question session so that we can consolidate all that we have encountered before moving on.

Review:

As you see, we are starting out by bringing together different threads from classical mechanics, quantum and E&M. We have developed a lot in the first two classes. You can use the little break here to do a review of whatever concepts you feel a bit weak on (i.e. Lagrangians, creation and annihilation operators etc). We will also use the following concepts pretty soon:

Schrödinger, Heisenberg and Interaction pictures in QM

The time development operator in the interaction picture (found in Merzbacher)

The energy and momentum of electromagnetic fields

Polarization for E&M

The Green function for the wave equation (in Jackson).

How much you review is entirely up to you. I will give a treatment of each topic as we encounter it, but it is always easier if you have a sense of the subject in advance.