

Quantum Field Theory I: PHYS 721 (Autumn 2020)
Quick quiz—Thursday, September 10.

Instructions

These quick quizzes are low-stakes assessment tools to help cement your understanding of our material. They will help you remember the key facts and can serve as a study guide to help you focus on material you are less familiar with. These quizzes do not contribute to your grade and are for your own use.

1. **Without looking at your notes or the textbook, and without consulting with your physically-distanced neighbour**, write your answer to each question in the **first column**.
2. After our review and class discussion, answer each question and write your answers to each question in the **second column**. You should complete the second column, but do not add anything to your first column.

There are four questions.

Question 1

Describe the interaction picture of quantum mechanics.

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Question 2

The mass term in the Dirac Lagrangian, which defines the behaviour of free fermionic fields $\psi(x)$ that describe spin-1/2 particles, is given by $m\bar{\psi}(x)\psi(x)$. What is the mass dimension of the fermion field? You can assume that the mass dimension of $\bar{\psi}(x)$, which describes an antiparticle, is the same as that of ψ itself.

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Question 3

Write down an expression for the scalar field $\phi(x)$ in terms of creation and annihilation operators.

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Question 4

What is the definition of a Green's function of a linear differential operator? What, physically, does a Green's function mean?

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