Quantum Field Theory I: PHYS 721 (Autumn 2020)
Quick quiz—Thursday, August 27.

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. You will need something to take notes in or on. 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 anyone**, write your answer to each question in the **first column**.
2. After our break-out room discussions, and our review, ensure that you write your final 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

Write down at least two reasons why we need Quantum Field Theory (QFT).

Question 2

Write down the equal-time commutation relations for scalar field theory.

Question 3

Why do we not see a conserved quantity corresponding to the symmetry of our Universe under spatial reflections?

Question 4

We generally require our quantum field theories to be "local". In fact, we argued that was a **virtue** of quantum field theories. How does this requirement fit, or otherwise, with observations of nonlocal interactions in experiments such as those that measure violations of Bell's inequality? Isn't quantum mechanics inherently nonlocal?