

Quantum Mechanics II: PHYS 314 (Spring 2021)
Quick quiz 3

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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 neighbour**, write your answer to each question in the **first column**.
2. Discuss with your neighbour and use your notes or the textbook as needed to 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 five questions.

Question 1

Describe the relationship between symmetries and conservation laws.

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Question 2

Why does discrete translational invariance lead to Bloch's theorem, and not to a conserved quantity?

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Question 3

Describe the relationship between the time-evolution operator and the Schrödinger equation.

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Question 4

We have only discussed parity in one dimension so far, but it is perfectly well defined in three dimensions. Under parity, vector operators transform to the negative of themselves (for example, $\hat{p} \rightarrow -\hat{p}$). Is the angular momentum operator a vector operator?

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Question 5

What is the coolest theorem in physics? Yes, there is one correct answer to this question.

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