Physics 113 Quantum Theory Seminar

Assignment 5 February 14,15, 2011

This week we apply the quantum formalism to photons, K-mesons, Stern-Gerlach devices and derive the Schrodinger equation.

Part 1: Readings

Boccio - Chapter 7(Pages 469-527 Sections 7.1-7.4). Chapter 8 (pages 537-544 Section 8.1)

You must do the readings BEFORE attempting the problems in order to get a good grasp of the overall content of the week's material to be understood. A problem should then make you look more carefully at specific parts of the readings that are necessary for the solution of that particular problem!

Prior to discussing any problems, we will deal with any questions and/or discussion of the readings.

Part 2: Everyone Problems

Everyone must understand these solutions.

Random choice of presenter.

Quality/correctness of presentation = 20% Seminar grade.

1. Boccio 7.5.2 Polaroids
2. Boccio 7.5.3 Calcite Crystal
3. Boccio 7.5.7 Time Evolution
4. Boccio 7.5.9 What comes out?
5. Boccio 7.5.12 Quarter-wave plate
6. Boccio 7.5.14 Interference

Part 3: Extra Problems

One seminar member has overall responsibility for each problem.

Solve as many as you can.

Attempting zero beyond your responsibility is NOT an option!

You will not understand solutions without attempting a problem.

Volunteer presenters OK. Never volunteering is NOT an option!
Quality/correctness of presentation = 30% Seminar grade.

1. Boccio 7.5.4 Turpentine _____
2. Boccio 7.5.5a What QM is all about - Two Views _____
3. Boccio 7.5.5b What QM is all about - Two Views _____
4. Boccio 7.5.8 K-Meson oscillations _____
5. Boccio 7.5.11 Find the phase angle _____
6. Boccio 7.5.13 What is happening? _____
7. Boccio 7.5.16 The Mach-Zender Interferometer and Quantum Interference _____

Midterm Problem #1 - Only consult with Professor

Boccio 7.5.6 - Photons and Polarizers (solution written up in LaTex)