

Physics 113 Quantum Theory Seminar

Assignment 14 April 25, April 26, 2011

This week we study Scattering Theory and Measurement Ideas.

Part 1: Readings

Zettili - Chapter 11 Pages 617-639

Boccio - Chapter 13(Section 11.1 Pages 1051-1076)

PRESENTATION: Chapter 16

All new material.

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 do all of these problems.

Random choice of presenter.

1. Z11-06 - Born Approximation - Scattering from exponential potential
2. Z11-07 - Born Approximation - Scattering from from double delta function potential
3. Boccio - 13.3.2 - Scattering Slow Particles
4. Boccio - 13.3.4 - Ramsauer-Townsend Effect

Part 3: Extra Problems - Presentations

Each seminar member has responsibility for 2 problem solutions/presentation. Look at/try to solve other problems besides your own responsibility. You will not understand other solutions without attempting or at least thinking about the problem before seminar.

Presentation #1 _____

Boccio - 13.3.1 - S-Wave Phase Shift

Presentation #2 _____

Boccio - 13.3.5 - Scattering from a dipole

Boccio - 13.3.14 - Scattering Electrons on Hydrogen

Presentation #3 _____

Boccio - 15.6.1 - Measurements in a Stern-Gerlach Apparatus

Presentation #4 _____

Boccio - 15.6.4 - Measurement of a Spin-1/2 Particle

Boccio - 15.6.6 - Which-path information, Entanglement, and Decoherence

Presentation #5 _____

Boccio - 15.6.5 - Mixed States vs. Pure States and Interference

Boccio - 15.6.8 - Measurements on Qubits

Presentation #6 _____

Chapter 16 - PRESENTATION: Hidden Variables, EPR and Bell

Final Problem #4 - Only consult with Professor

Boccio - 13.3.23 - Nucleus as sphere of charge - Scattering (solution written up in LaTeX)