Lecture 21

The Seq in 3-D Central Potentials
The Pieces of the Course

- Wave particle duality
- Bound states of quantum mechanical potentials
- Quantum mechanical states of optical radiation field
- Interaction of quantized light and matter
Summary of the quantum postulates

• There is a (normalized) state vector
• Unitary evolution of the state vector is generated by a Hamiltonian
• Measurements are represented by Hermitian operators that place the system in a measurement eigenstate
• A composite state vector is represented in a basis that is an outer product of the basis sets of its component state vectors
The Midterm (MT)

- October 17
- 50 minutes in class
- For Caete will be due October 24
- MT will cover first three problem sets
- There will be (probably) two problems with calculations from the HW
Topics From Last Time

- The scalar wave equation in 2-D
- Finite and infinite square wells
- Two dimensional SHOs
- Cylindrical coordinates
- Seq in cylindrical coordinates
- Finite and infinite cylinders
- SHOs in cylindrical coordinates
- Degeneracies
Topics For Today

- The scalar wave equation in 3-D
- A guess for the state vector and the unitary evolution after a projective measurement
- SoV in 3-D
- Spherical Harmonics
- Radial eigenfunctions for a well
- Degeneracies in 3-D SHOs