Physics 4610, Quantum Mechanics   Name _____
Prof. Schroeder
Spring 2020

Problem Set 6
(due Monday, February 24, 4:00 pm)

1.   Problem 4.2, page 106 (a cat state in two dimensions). Sketch the alternative wave-functions as density plots, like Figure 4.4.

2.   Problem 4.5, page 107 (separable dynamics in 2D). Neither of these proofs needs to be lengthy, but the logic is important so be sure to explain them clearly. I will give hints in class.

3.   Problem 4.10, page 110 (a superposition state for a square infinite square well).

4.   Problem 4.13, page 111 (energy levels of a 3D cube-shaped infinite square well).

5.   Problem 4.18, page 115 (simulation of single-hole diffraction in 2D).

6.   Problem 4.21, page 120 (interpreting two-particle wavepackets). To determine the directions of motion, you'll need to look carefully at the order of the color sequence in each image.

7.   Problem 4.22, page 122 (interpreting a two-particle cat state).

8.   Problem 4.23, page 125 (probability density sketches for a two-particle state).

9.   Problem 4.24, page 125 (sketches of some two-particle wavefunctions). Please sketch two-dimensional density plots, using colored pencils to distinguish positive from negative values. Don't try to sketch 3D surface plots!

10. Problem 4.26, page 127 (computer memory needed to store multi-particle wavefunctions).