

Homework #8; Due Wed. 4/19 (Last HW before Midterm on Monday 4/24! No late HW!)

1. Assume you have a particle with charge q and mass m in a simple harmonic oscillator potential. The wavefunction starts in the state $\sqrt{\frac{2}{3}}|\psi_0\rangle + \sqrt{\frac{1}{3}}|\psi_1\rangle$ (before $t=0$). At $t=0$ a constant electric field is turned on of strength E_1 (in the x -direction), and then at $t=t_1$ the field strength is changed to E_2 . What is the probability of finding the particle in the ground state at some time $t > t_1$? (You can assume the field is turned off for the final measurement, and that the field is weak. Solve to 1st order in perturbation theory.) Don't do all the algebra when you square the coefficient; just square your answer and leave it!

Warning: some of the book results won't be relevant, because they always tend to assume the initial state is a pure eigenstate.

2. Problem 9.15, parts a and b only.

3. Problem 9.20, except part c. Meaning: don't bother "proving" the result in part c); just assume it is true. And don't bother with a detailed sketch in e), but do find the FWHM in that part.