

An electron is prepared in a superposition of two energy eigenstates, $\psi \propto (3\psi_1 + 2\psi_2)$. ψ_1 and ψ_2 are individually normalized and have energies of $E_1 = 2$ eV, $E_2 = 5$ eV, respectively.

- a) [4 points] Suppose you measure the electron's energy. What result or results might you obtain?
- b) [6 points] Write an expression for the normalized wave function
- c) [6 points] Consider the time dependence. At $t = 0$, the probability density is $P(x, 0)$. When is the next time that the probability density $P(x, t)$ returns to its $t = 0$ value (i.e., $P(x, t) = P(x, 0)$)? You should give a numerical answer, in seconds.
- d) [4 points] If the energy E_2 is measured, write the complete *normalized* state, ψ , after the measurement, in terms of ψ_1 and ψ_2 .