

Homework 12:

Remember: In addition to this problem, you also have a “Mastering Physics” assignment Due May 1 Due at the **beginning** of lecture, Friday, May 1 Write up of the solution to this problem in a coherent fashion.

An electron at rest is accelerated through a voltage V . The now moving electron strikes a proton and is captured by it to form a hydrogen atom. The hydrogen atom can be in any of its states labeled by n . Since the energy of the hydrogen atom is less than the energy of the moving electron and the proton, energy conservation requires the emission of a photon to get rid of the excess energy. Thus electromagnetic radiation will occur.

What is the wavelength of this? You should express your answer in terms of V, e, \hbar, n, m_e, c and ϵ_0 .