2. **Radiating Fields**

(a) A hydrogen atom has a diameter D of about 1×10^{-8} cm. What is the frequency ω_0 of the rotation of the electron around the much more massive proton? Ignore relativity.

(b) Replace the rotating electron with a negative charge oscillating back and forth with the angular frequency ω_o. Find the average power I_{tot} radiated over all space. You will need to do the power integral to get full credit, starting from the radiated field at position r and angle θ.

(c) Make the incorrect assumption that the average radiated power is constant with time and estimate the lifetime of a hydrogen atom in seconds.