

Phys 110B; HW #4, due Monday 2/27

1. Problem 9.3 (both editions)
2. Problem 9.12 (3rd edition) or 9.13 (4th edition)
3. The highest intensity laser to date can achieve 10^{21} W/cm^2 . Find the strength of the peak electric field and the peak magnetic field in such a laser focus spot. (Hint: What quantity have we studied with the same units as W/cm^2 ? Use it! Also; I'm not asking for the time-average, I'm asking for the absolute peak field.)
4. Consider the superposition of the plane waves $E_1 = E_0 \cos(kz - \omega t)\hat{x}$ and $E_2 = E_0 \cos(kz - \omega t + \pi/2)\hat{y}$.
 - A) Find the electric field vector at a fixed point in space as a function of time; describe your result physically.
 - B) Looking at the wave as it approaches you, does the E-field rotate clockwise (right circular polarization) or counter-clockwise (left circular polarization)?
 - C) Describe this wave using complex notation. (What is the complex amplitude, expressed as a vector?)