Preparation Assignments:

Due Wednesday, January 15(14)

A 150 [MHz] source is connected to a transmission line circuit. A good experimenter determines that the wavelength on the transmission line is 1.5 [m].

How fast is the wave propagating down the transmission line?

How long does it take to travel 1000 [m]?

If the line is lossless ($R = G = 0$) and has a capacitance, C = 1E-10 [F/m], and inductance, L = 2.5E-7 [H/m], what is the characteristic impedance, Z_o?

Due Thursday, January 16

Determine the amplitude, frequency, and velocity of the following time domain form of the voltage wave propagating on a transmission line:

$$V = 20\cos(\pi \times 10^7 t - \frac{\pi}{20} z) \text{ [V].}$$

If the line has a 75 [Ω] characteristic impedance (typical of cable tv), what is the time domain expression of the current wave?

Due Monday, January 20

Determine the radiated magnetic field of a Helium atom using the classical Bohr model. You may use any reasonable approximation for atomic distances.

Due Wednesday, January 22(21)

If we are trying to model a transmission line with 150 [Ω] characteristic impedance and a 2.5E8 [m/s] propagation velocity, what is the inductance and capacitance per unit length?

What does the phrase “matched line” (also called “matched load”) imply about a transmission line circuit?