

## E157 Lecture 16 Day Plan

Any questions before quiz

Quiz + Team Quiz + Talk through solution

Grade release and Mid-semester review discussion

Power in wires is carried as EM waves:

- Wires themselves don't carry any power –  $S=0$  in conductor because  $E=0$
- Average speed of electrons in metal  $\sim 1\text{cm/s}$
- Current is # electrons / second  $\rightarrow$  big DC current from large # electrons

Antenna standing waves vs. transmission line standing waves

- Waves stand on antennas b/c of fwd/rev propagation, just like transmission lines
- Tap into antenna wave pattern  $\rightarrow$  impedance, just like VSWR and  $Z_{dp}$
- Where exactly does the radiation come from in a dipole, patch
- Out of phase field turns into L and C

Design characteristic roundup

- $R_{rad}$  – function of feed location, tricky field calculations, frequency
- $X_{rad}$  – function of feed location, tricky field calculations, frequency
- $R_{loss}$  – depends on construction, frequency
- Bandwidth – function of matching+ $X_{rad}$  OR standing wave geometry
- Polarization

Review monopole – why don't car antennas or other whip antennas look like dipoles?

Group research (find field pattern, input impedance, bandwidth, common application) for:

- Loop antennas
- Slot antennas
- Horn antennas
- Yagi-Uda antennas
- Parabolic reflectors
- PIFA