8/27/14 Phys 2426 Lecture 1

Electricity
- Electrostatics
- DC Circuits

Magnetism
- Magnetostatics
- Induction
- AC Circuits

Waves & Oscillations
- Sound, String, EM Waves (Light)
- Wave Effects
- Optics

Electricity and Charges

Gravitation	Electrostatics
Mass m	Charge q or Q
kilograms kg	coulombs C
Always ⊕	Can be ⊕ or ⊖

Particles of charge

Proton	$q_p = +1.6 \times 10^{-19}\,C = +e$
Electron	$q_e = -1.6 \times 10^{-19}\,C = -e$

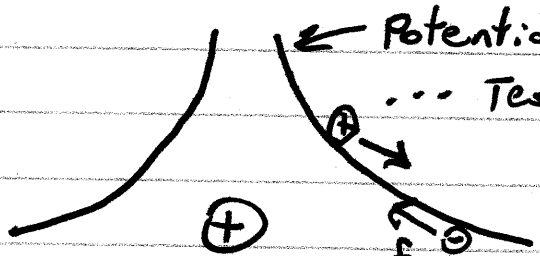
Most elec. effects are due to electrons.

Gravitational Wells

- All masses make "dents"
  These are low (negative) grav. potential areas.
- Other masses attracted to low spots.
- The force points "downhill".

Electric Potential (AKA Voltage)

- Positive charges make "hills";
  ⊖ make "dents".
- ⊕ charges attracted "downhill".
  ⊖ charges "bubble up"



- The steepness of the potential is the Electric Field.

$\vec{E}$ points "downhill" $\Rightarrow \vec{F} = q_o \vec{E}$

$E_x = -dV/dx$ ← test charge