

# Lecture 2 - Coulomb's Law and Electric Field

## Chapters 25 and 26 - Thursday January 11th

- Quick review of Tuesday's class
- Coulomb's Law
  - Scalar and vector notation
  - Discrete charge distributions (superposition principle)
  - Continuous charge distributions
- Electric fields
  - Discrete charge distributions
  - Continuous charge distributions
- Electric field lines

Reading: pages 567 thru 597 (chapters 25 & 26) in HRK

Read and understand the sample problems

WebAssign: set 1, due Thur. 18th at 11:59pm

**Graded problems: Ch. 26 – Ex. 8, 13, 18, 36; Prob. 10**

**Practice problems: Ch. 26 – Ex. 7, 14, 23 ; Prob. 1**

# What is charge?

- Charge is measured in Coulomb's (C)
  - Fundamental unit.
  - Definition based on forces between current carrying wires (current = Ampères, or C/s), i.e. chapter 33.
- Charge is discrete
  - Thompson discovered the electron in 1896. He found that charge was carried by elementary particles with the same charge to mass ratio.
  - The elementary charge of the electron was not measured until 1909 (Millikan).
  - Both experiments earned Nobel prizes.

Charge on an electron:	$e = 1.6 \times 10^{-19}$ Coulombs
1 Coulomb of charge:	$6.24 \times 10^{18}$ electrons
1 Ampère (= 1 C/s)	$6.24 \times 10^{18}$ electrons/second

Charge is discrete:  $q = ne$        $n = \pm 1, \pm 2, \pm 3, \dots$

# Static electricity through charging

