

PH 202

- Electricity

- Magnetism

- Optics

Charge is a fundamental property of matter that indicates how matter is affected by electric and/or magnetic fields.

Charge can be either positive or negative.

Fundamental Laws of Charges

1. Like charges Repel
 2. Opposite charges Attract
- } Ben Franklin

Atoms

1. Protons - + charged } nucleus
2. Neutrons
3. electrons - - charged - orbit nucleus

electron discovered 1897

Atoms well understood 1913 - Bohr atom

1940's atomic physics

Neutron - 1935

Quantum mechanics

1912 - Rutherford Experiments

Shot Alpha particles (He nucleus)

at Gold atoms and found

greatest scattering at 180°

A cannon ball fired at tissue paper
and the ball hits you in the face.

Rutherford proved dense atomic nucleus.

electrons orbit nucleus. They can be
easily removed or occasionally added

Charge Q
 q

$$Q = Ne$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

fundamental charge for
an electron and proton

An object with $-5.0 \mu\text{C}$ of net charge
how many excess electrons (e^-) are
on charge?

$$Q = N(q) = N(-e)$$

$$N = \frac{Q}{-e} = \frac{-5.0 \times 10^{-6} \text{ C}}{-1.6 \times 10^{-19} \text{ C}}$$

$$N = 3.13 \times 10^{13} e^-$$

How does an object become charged?