Electric Charge

Most of classical physics can be described in terms of three fundamental units, which define our physical "reality".

1. Mass (e.g., *kg*) 

2. Distance (e.g., *meters*) 

3. Time (e.g., *seconds*) 

From these fundamental units, we can define other important physical parameters. For example, **energy** can always be described in units of $kg\ m^2/s^2$.

But, these three fundamental units alone are insufficient for describing all of classic physics—we require one more to completely describe physical reality!

This fourth fundamental unit is **Coulomb**, the unit of **electric charge**.

> All **electromagnetic** phenomena can be attributed to electric charge!

We shall find that electric charge is **somewhat** analogous to mass. However, one important difference between mass and charge is that charge can be either **positive** or **negative**!

Essentially, charge (like mass) is a property of **atomic particles**. Specifically, we find that:

The charge "on" a **proton** is $+1.6 \times 10^{-19}$ *C*

The charge "on" a **neutron** is 0.0 *C*

The charge "on" an **electron** is -1.6×10^{-19} *C*

Charged particles (of all types) can be **distributed** (unevenly) across a volume, surface, or contour.