

# Chapter 21: Electric Charge

In this chapter we will introduce a new property of matter

that is known as

electric charge (symbol  $q$ )

Moreover, we will describe the following properties of charge:

- Types of electric charge
- Forces among two charges (Coulomb's law)
- Charge quantization
- Charge conservation

Empirically it was known since ancient times that if amber is rubbed on cloth, it acquires the property of attracting light objects such as feathers.

This phenomenon was attributed to a new property of matter

called "electric charge"

Experiments show that there are two distinct types of electric charges

Positive (color code: red)

Negative (color code: blue/black)

Experiments showed on charged objects that:

1. Charges of the same kind (either positive or negative) repel each other

2. Charges of opposite type attract each other

To figure out an unknown charge the recipe is as follows:

We charge a glass rod by rubbing it with silk cloth and we know that the charge on the glass rod is positive. The rod is suspended in such a way so it can keep its charge and also is able to rotate freely under the force applied by charge with the unknown sign.

We approach the suspended glass rod with the new unknown charge.

Two outcomes are possible

1. The two objects repel each other  
We then conclude that the unknown charge is

positive