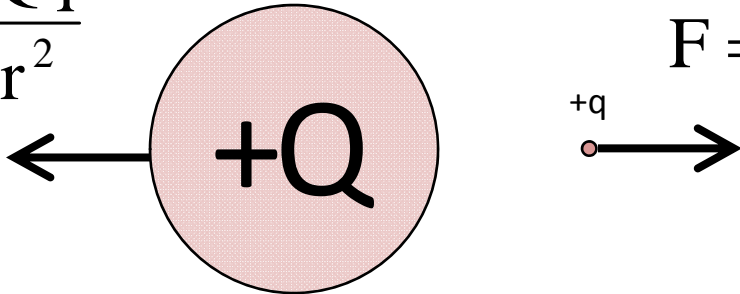


Class 6. More electric Fields

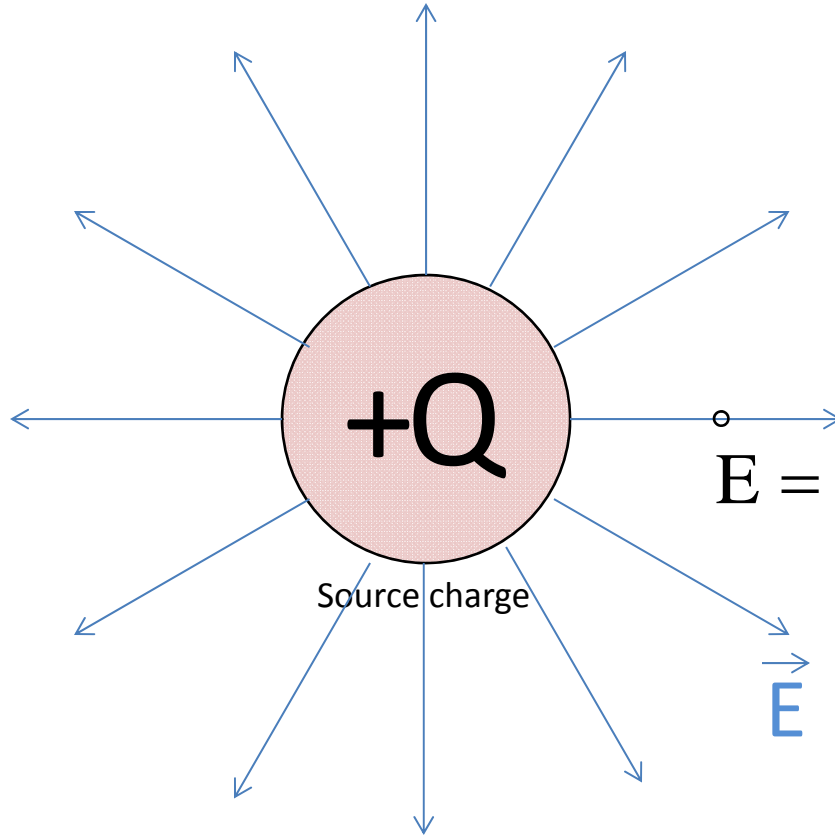
Concept of Fields

$$F = \frac{1}{4\pi\epsilon_0} \frac{Qq}{r^2}$$

$$F = \frac{1}{4\pi\epsilon_0} \frac{Qq}{r^2}$$



Why these two charges can experience a force from the other even though they are not in physical contact?

Concept of Fields



There are fields attached to a charge. The fields (geometry and intensity) depend on the charge distribution.

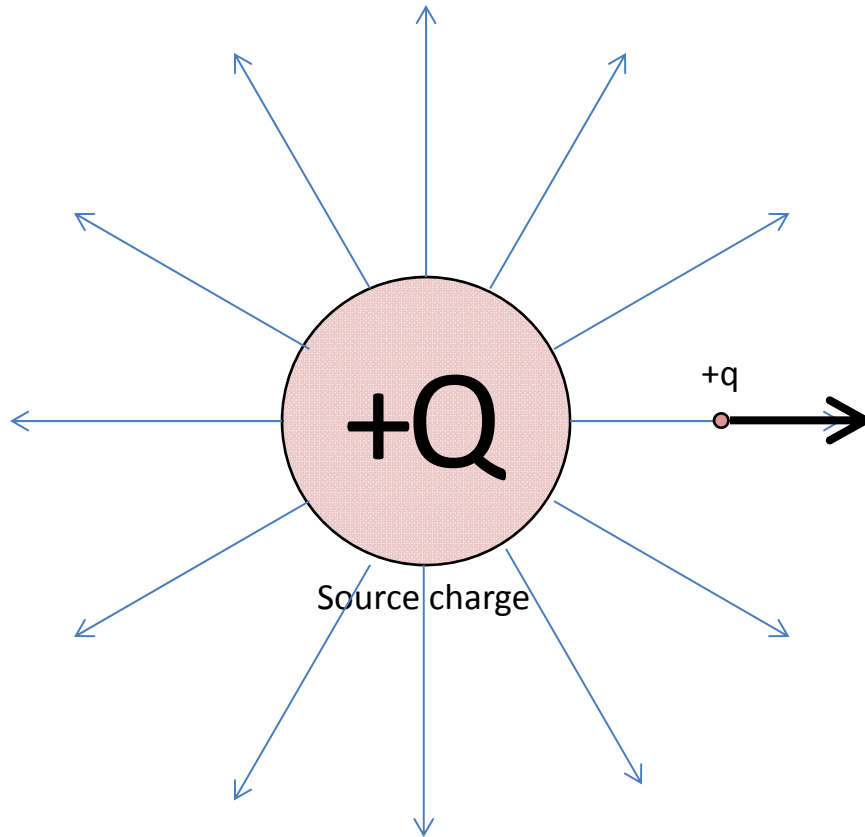
$$E = \frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} \leftarrow \text{Magnitude equation}$$

Electric field is a vector.
Unit of electric field: N/C

The charges that give rise to the electric fields are called the *source* charges.

Charge	\Rightarrow	Electric field
Mass	\Rightarrow	Gravitational field

Concept of Fields



Electric field E due to
source charge Q

$$F = \left(\frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} \right) q$$
$$= q E$$

Let us call the charges that are being placed in an electric field to experience the force the *external* charges.

In the above figure, Q is the source charge and q is the external charge.

When another charge is put in the field, it will experience an electric force. The force depends on the charge and the electric field at that point.

The problem is now split into two:

1. Calculate the electric field due to the source charges.
2. Calculate the force acting on the external charges.