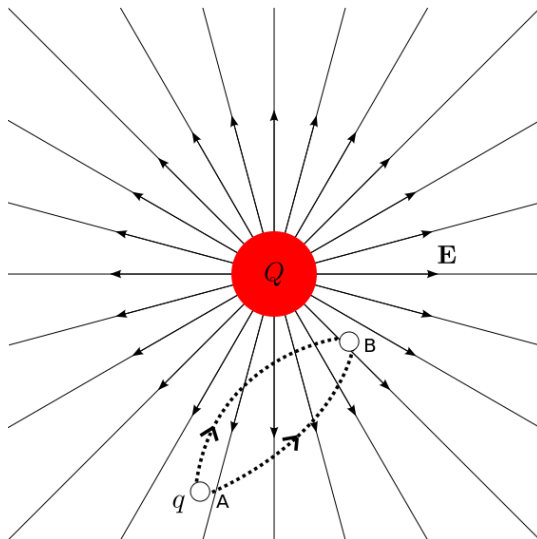


Electrical potential difference (denoted ΔV and measured in units of electric potential: volts, or joules per coulomb) is the electric potential difference between two points, or the difference in electric potential energy of a unit charge transported between two points. Voltage is equal to the work done per unit charge against a static electric field to move the charge between two points. Voltage can be caused by static electric fields, by electric current through a magnetic field, by time-varying magnetic fields, or some combination of these three.

Some words about electric field, electrostatic fields are E-fields which do not change with time, which happens when the charges are stationary.

We can see that:



Given two points in the space, called A and B, voltage is the difference of electric potentials between those two points. From the definition of electric potential it follows that:

$$\begin{aligned} \Delta V_{BA} &= V_B - V_A = - \int_{r_0}^B \vec{E} \cdot d\vec{l} - \left(- \int_{r_0}^A \vec{E} \cdot d\vec{l} \right) \\ &= \int_B^{r_0} \vec{E} \cdot d\vec{l} + \int_{r_0}^A \vec{E} \cdot d\vec{l} = \int_B^A \vec{E} \cdot d\vec{l} \end{aligned}$$