

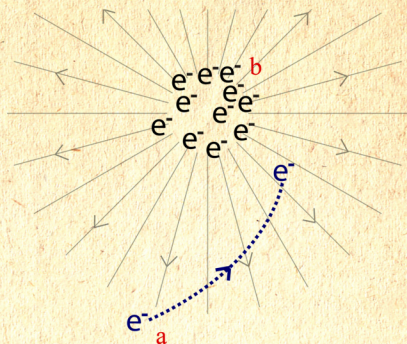


IS FOR VOLTAGE

Voltage represents potential difference, the amount of energy needed to move a charge from one charge density to another. You would expend one joule of energy in moving one coulomb of charge through a potential difference of one volt.

$$V = \frac{E}{C}$$

One volt is one joule per coulomb.



Voltage is one of the most important concepts in E&M, and unfortunately it's also pretty slippery. In the above example, charge a is moved towards charge b. b will exert a force against a, and so energy is expended in moving the charge a to its new location. How much energy would depend on the amount of charge in a and b, and the relative distances moved.

But as a measure of energy that is only dependent on b and independent of the charge of a is more useful, we divide out the charge of a to get energy per unit charge (in the same way that speed is distance per unit time, for example). Voltage is only meaningful with respect to one point versus another.

Example: A car battery is 12V. In drawing one amp from it, you transfer a coulomb per second of charge from one terminal to another (definition of an amp). So 12 joules of energy are dissipated every second. A joule per second is a watt, so the circuit pulls 12