Electric fields

An electric field is a force field that surrounds an electric charge. The field exerts a force on other electric charges in the field. The size of the force is proportional to the charge, and the direction of the force is determined by the sign of the charge. The electric field is represented by the symbol E.

The force exerted by an electric field on a charge is given by the equation:

$$F = qE$$

where q is the charge and E is the electric field.

The SI unit for electric field is the volt per meter (V/m).

The electric field can be created by a charge or by a changing magnetic field.

A charged particle creates an electric field in the space around it. The strength of the field is proportional to the charge on the particle.

The electric field of a point charge is given by the equation:

$$E = kq/r2$$

where k is the Coulomb constant, q is the charge, and r is the distance from the charge.

The electric field of a uniformly charged sphere is given by the equation:

$$E = kQ/R2$$

where k is the Coulomb constant, Q is the charge on the sphere, and R is the radius of the sphere.

A changing magnetic field also creates an electric field. This is called an induced electric field. The strength of the induced electric field is proportional to the rate of change of the magnetic field.

The electric field can be used to measure the charge on an object. This is called the charging by induction method.

The electric field can also be used to measure the electric potential of an object. This is called the electrostatic potential method.

The electric field can be used to move charges. This is called the electrophoresis method.

The electric field can be used to separate charges. This is called the dielectrophoresis method.