

6.2 - Electric Fields

Definitions and Core Info

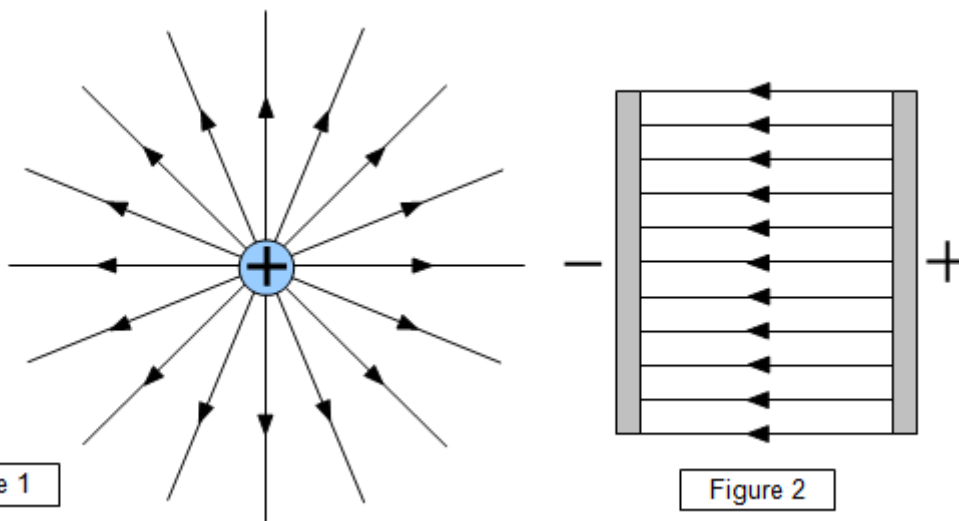
An electric field is a region around a body in which other charged bodies will feel a force. The direction of the field is the direction of the force experienced by a positive test charge.

$$E = \frac{F}{Q} = \frac{Q}{4\pi\epsilon_0 r^2}$$

... where F is the size of the electrical force, Q is the size of the charge, epsilon 0 is the permittivity of free space, and r is the distance between the charged point and any point in the field.

Electric Field Lines

Radial field vs uniform field¹:



The spacing between field lines represents the strength of the field.

The field between different types of charged surface¹:

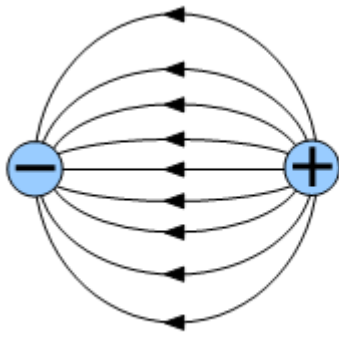


Figure 3

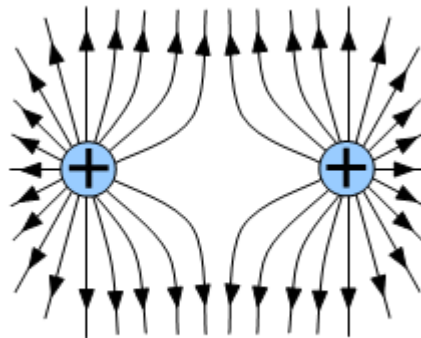


Figure 4

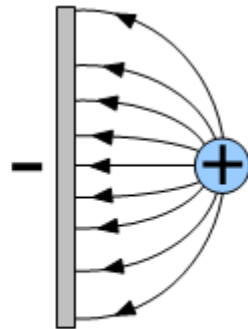


Figure 5

The neutral point is between two like-charged particles, showing where no electric force is experienced.

Coulomb's Law

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

... where Q and q are the charges of two charged points, epsilon 0 is the permittivity of free space, and r is the shortest distance between these charged points.

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