



Electromagnetic waves

Lecture 3 +4

**Static Electric Field with
Coordinates**

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Electric field

- E-field is the physical field that surrounds electrically charged particles and exerts force on all other charged particles in the field, either attracting or repelling them.
- The electric field is represented by lines called lines of electric force or electric field lines.

Electric fields originate from electric charges, or from time-varying magnetic fields.

Electric fields and magnetic fields are both manifestations of the electromagnetic force.

Electric fields are important in many areas of physics, and are exploited practically in electrical technology.

In atomic physics and chemistry, for instance, the electric field is the attractive force holding the atomic nucleus and electrons together in atoms. It is also the force responsible for chemical bonding between atoms that result in molecules .

The electric field is defined mathematically as a vector field that associates to each point in space the (electrostatic or Coulomb) force per unit of charge exerted on an infinitesimal positive test charge at rest at that point.

derived SI units for the electric field are volts per meter (V/m), exactly equivalent to newtons per coulomb (N/C).

The electric field is divided into

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graph TD; A[The electric field is divided into] --> B[Non-uniform electric field]; A --> C[Uniform electric field];
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Non-uniform electric field It is the field whose magnitude changes between one point and another point such as the field generated around a charged conductive ball.

Uniform electric field It is a field of constant magnitude and direction at each of its points, and the lines of force are parallel and of uniform density.

