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PNC

The electric field in matter involves how electric fields interact with substances, leading to polarization in conductors and dielectrics. Dielectrics have charges attached to atoms that can be displaced by an external field. The resulting effect is an modified electric field within the material due to the induced dipoles or charge movement, which is a fundamental concept in electromagnetism.

→ Electric field in different materials →

(a) Conductors → These materials contain free charges, such as electrons in a metal, that can move throughout the substance.

(b) Dielectrics (Insulators) → In these materials, charges are bound to specific atoms or molecules.

(i) Non polar molecules → An external electric field causes a displacement of the positive and negative charge centers, inducing a dipole moment in each molecule. This is called polarization.

(ii) Polar molecules → These molecules have a permanent dipole moment even without an external field. When an external field is applied, these molecules tend to align themselves.

align themselves with the field, though thermal agitation may prevent complete alignment.