Electromagnetic waves

Lecture 6

Electric field and flux density

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❖ Electric Flux Density (D)

In 1837,Michael Faraday performed the experiment on electric field . He showed that the electric field around a charge can be imagined interms of presence of the lines of force around it. He suggested that the electric field should be assumed to be composed of very small bunches containing afixed number of electric lines of force. Such a bunch or closed area is called a tube of flux. The total number of tubes of fulx in any particular electric field is called as the electric flux .
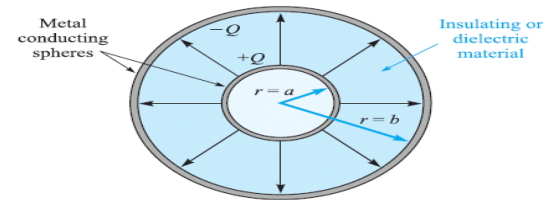

Figure 3.1 The electric flux in the region between a pair of charged concentric spheres. The direction and magnitude of D are not functions of the dielectric between the spheres.

- Electric flux ($\vec{D}$) is defined as the measure of the number of electric field lines that penetrate a given area .
- If the lines are out of the charge, the charge will be positive, and if the lines are entering the charge, it will be negative
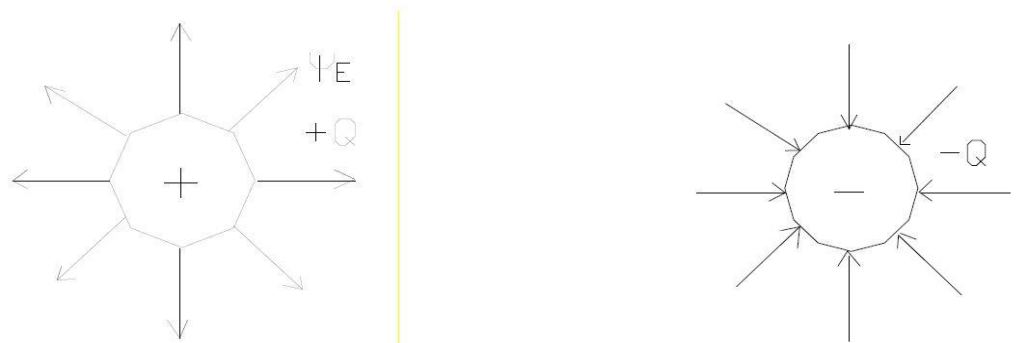
- Electric flux density, measured in coulombs per square meter (sometimes described as "lines per square meter," for each line is due to one coulomb)
- Electric flux D originates on positive charge and terminates on negative charge. In the absence of negative charge, the flux φ terminates at infinity.
- Electric flux density is more descriptive, however, and we will use the term consistently.