Electromagnetism
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Lecture - 66
A comparison between electrostatics nad magnetostatics

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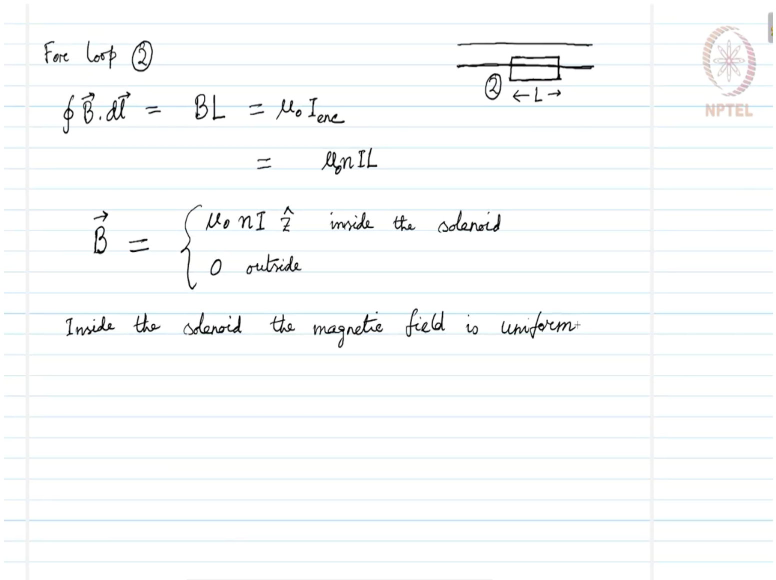

Now, after learning this much about the magnetic field let us have a comparison between electrostatics and magnetostatics.

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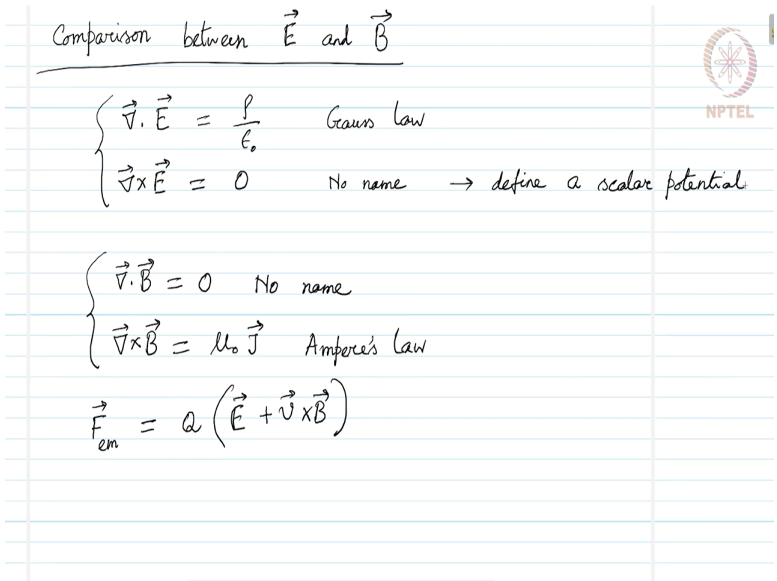

For electric field we wrote down the divergence of the electric field, we calculated this to be rho over epsilon naught this is known as Gauss law and the curl of the electric field was 0 and this has no name this law has no name. In case of magnetic field we have just derived that the divergence of the magnetic field is always 0, this law has no name and the curl of the magnetic field is non zero is mu naught times the volume current density and this law is known as the Ampere's law.

So, in terms of the divergence and the curl electric field and magnetic field behave oppositely to each other and the electromagnetic force that we have calculated, that we have found out is Q E plus v cross B this is what we have learnt about the electromagnetic force over a charge.

So, here the amount of charge is Q electric field applies on it and the force is along the direction of electric field. Magnetic field applies the force only when the charge is moving with velocity v and then the direction of the force is perpendicular to the velocity of the charge as well as perpendicular to the magnetic field itself that is very interesting.

So, we find that electric field and magnetic field they do not behave similarly to each other and because we had curl of the electric field going to 0 that let us define a scalar potential.