

Electrodynamics-I

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Unification of theories

- In the beginning, electricity and magnetism was entirely separate subjects
- Electricity dealt with glass rods, cats fur, pith ball, electrolysis and lightning
- The other mean magnetism dealt with bar magnets, iron filling compass needles, and the North Pole.
- In 1920 Oersted noticed that electric current could deflect a magnetic compass needle.
- Soon afterward, Ampere correctly postulated that all the magnetic phenomena are due to electric charges in motion.

Unification of theories

- Then in 1831, Faraday discovered that moving magnet could generate an electric current.
- By the time Maxwell and Lorentz put the finishing touch in the theory and said that electricity and magnetism were intertwined.
- Faraday had speculated that light too is electrical nature and Maxwell theory provided the justification of his hypothesis and soon optics was incorporated into electromagnetism.
- Hertz after the experimental confirmation of Maxwell theory put it in this way
“the connection between the light and electricity is now established”

Unification of theories

- By the 1900, three branches electricity, magnetism and optics had merged into a single unified theory called electrodynamics.
- Einstein dreamed of further unification of gravity and electrodynamics
- Electroweak theory of Glashow, Weinberg and Salam (1960)
- Superstring theory (1980)

Field formulation of elect