* Field exists cause of moving charge

**Magnetic Field of a Moving Charge**

* Magnetic fields also have source and field points
* Magnitude is proportional to 1/r^2 and q
* Direction of magnetic field is perpendicular to the plane containing the line
* B is also proportional to particles velocity vector

Moving Charge: Magnetic Field Lines

* Magnetic field lines are circles centered on line for velocity and lying in perpendicular planes
* To find direction of field lines, grab velocity vector with right hand, with thumb in direction of velocity. The direction of your fingers is the direction of the field lines.

**Magnetic Field of a Current Element**

* Total magnetic field by sveral moving charges is a vector sum of the fields caused by the individual charges

Current Element: Vector Magnetic Field

To find magnetic field over a space, you have to integrate over all segments that carry current

Current Element: Magnetic Field Lines

* Field lines set up by current element are in the same direction as those that occur due to a moving charged particle

**Magnetic Field of a Straight Current Carrying Conductor**

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