

magnetic field and magnetic force

<p>moving q_s (including I_s or a magnet)</p> <p>unit for $q = C$ unit for $I = A = C/s$ scalars</p>	<p>\vec{B} forms loops that encircle I_s. Don't curl your fingers. Put your thumb in the location of I_s and your fingers in the location of \vec{B}. thumb: dir I_s finger pads: dir \vec{B}</p> <p>Ampere's law for steady current: $\oint \vec{B} \cdot d\vec{s} = \mu_0 I_{\text{encircled}}$</p> <p>Line current: $\vec{B} = \frac{\mu_0 I_s}{2\pi r}$ ($r =$ distance from wire)</p> <p>Center of current loop: $\vec{B} = \frac{\mu_0 I_s}{2r}$ ($r =$ radius of loop)</p> <p>Current sheet: $\vec{B} = \frac{1}{2} \mu_0 J_s$ (units for $J_s = A/m$)</p> <p>Inside a solenoid: $\vec{B} = \mu_0 n I_s$ (units for $n = 1/m = \text{loops/m}$) Outside a solenoid: $\vec{B} = 0$</p> <p>$\mu_0 = 4\pi \times 10^{-7} \text{ N/A}^2$</p>	<p>Don't curl your fingers. finger tips: dir $q_0 \vec{v}_\perp$ or $I_{0\perp}$ palm: dir \vec{B} thumb: dir \vec{F}_B</p> <p>Force on moving charge: $\vec{F}_B = q_0 \vec{v}_\perp \vec{B}$ $= q_0 v \dot{B} \sin \theta$ (v_\perp is the component of \vec{v} that is perpendicular to \vec{B}; θ is the angle between \vec{B} and \vec{v})</p> <p>Force on current-carrying wire: $\vec{F}_B = I_{0\perp} L \vec{B}$ $= I_0 L \dot{B} \sin \theta$ ($I_{0\perp}$ is the "component" of the current that is perpendicular to \vec{B}; θ is the angle between \vec{B} and the current)</p>
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You must use S.I. units in all the formulas in this chart.