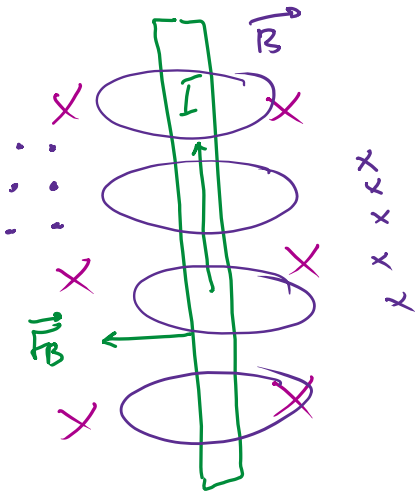
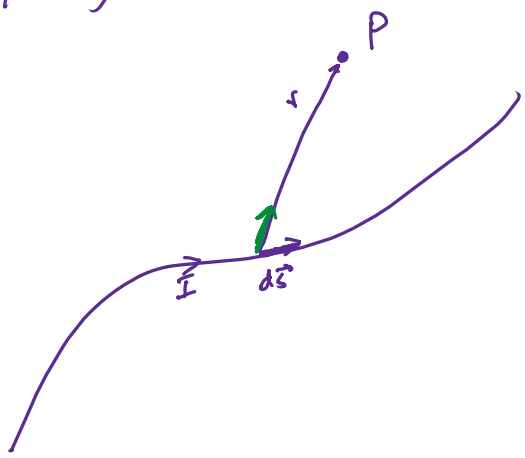
$$\vec{F}_B = I\,\vec{l} \times \vec{B}$$

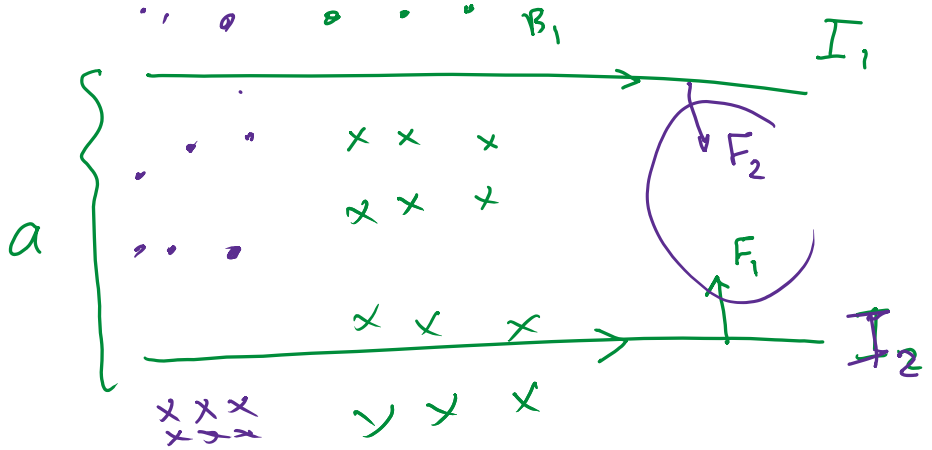


$$\vec{B} = \frac{\mu_0 I}{4\pi} \int \frac{d\vec{s} \times \hat{r}}{r^2}$$ Biot-Savart law



$\vec{B}$ is $\perp$ $\vec{r}$ & $d\vec{s}$

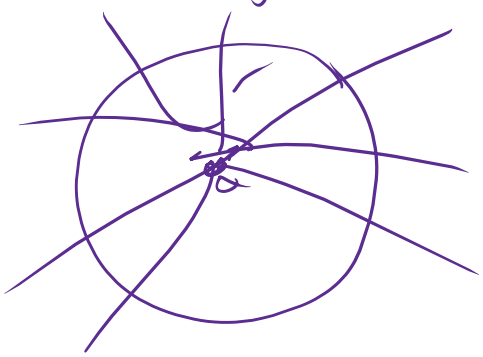
$$F_1 = F_2 = \frac{\mu_0 I_1 I_2 \ell}{2\pi a} \Rightarrow \frac{F_1}{\ell} = \frac{\mu_0 I_1 I_2}{2\pi a} \quad (N/m)$$



Ampere's Law:

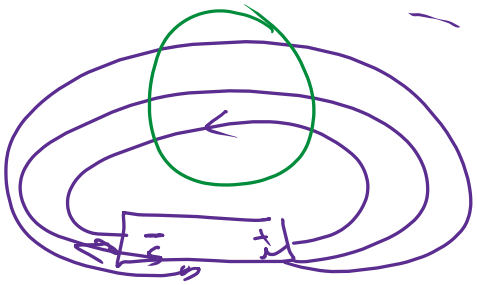
$$\oint \vec{B} \cdot d\vec{s} = \mu_0 I$$

$$\Phi_E = \int \vec{E} \cdot d\vec{A} = \frac{q_{in}}{\epsilon_0}$$



Magnetic Flux

$$\Phi_B = \int \vec{B} \cdot d\vec{A}$$



Φ_B for any closed surface = 0