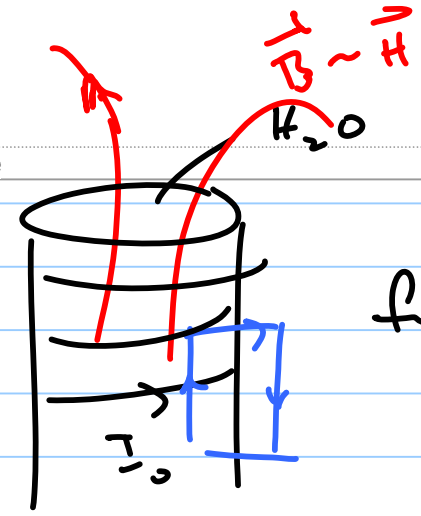
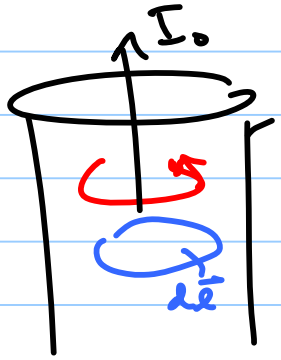
Note Title 4/23/2008



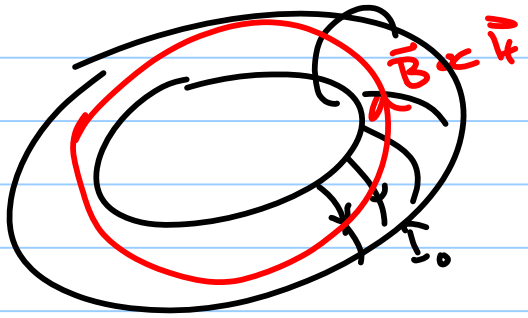
$$\oint \vec{H} \cdot d\vec{\ell} = I_{f,\text{enclosed}}$$

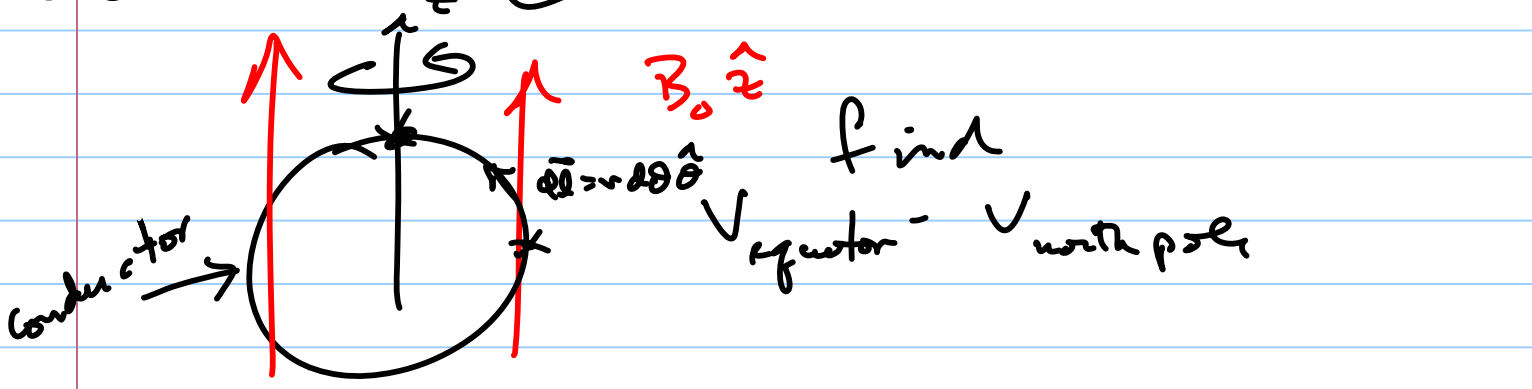
find B: 1st H Then $B = \mu H$

$\mu_0(1+\chi_m)$



copper find B:

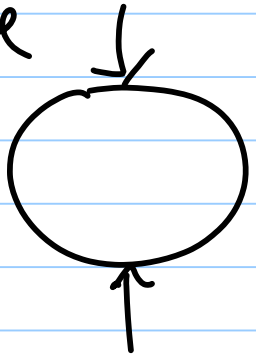




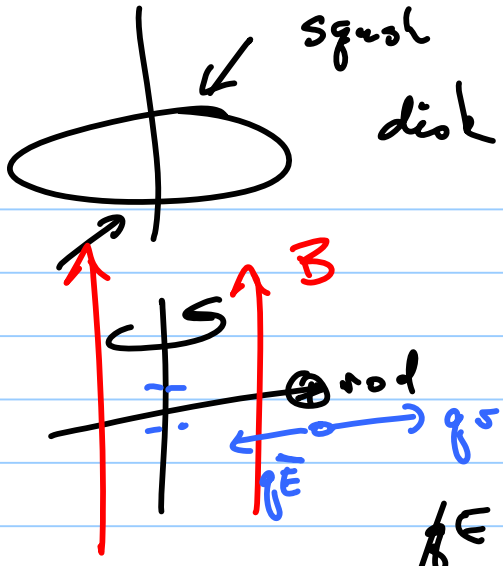
find $V_{\text{equator}} - V_{\text{north pole}}$

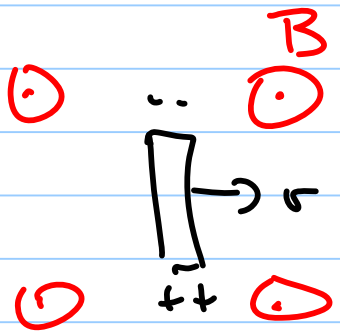
conducting shell

Simplify



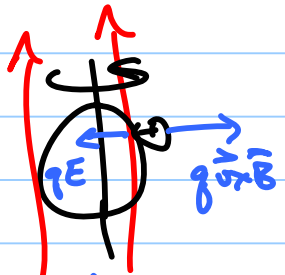
squash





$$\oint \mathcal{E} = q v B$$

$$\Delta V = -\int \vec{E} \cdot d\vec{\ell} = \int_0^a v B \hat{r} \cdot dr \hat{r}$$



go back to the hard problem

$\vec{E} = \vec{v}\times\vec{B}$: $\vec{v} = \vec{\omega}\times\vec{r} = \omega r \sin\theta\, \hat{\phi}$ ($\hat{z}\times\hat{r}$) $\quad \vec{v}\times\vec{B} = \omega r \sin\theta\, \hat{\phi}\times B_0 \hat{z}$

$$\Delta V = \int \vec{E}\cdot d\vec{\ell} = \int \omega r \sin\theta B_0 \hat{\phi}\times\hat{z}\cdot\hat{\theta}\, r\, d\theta = \int \omega r \sin\theta B_0 r\, d\theta \cos\theta$$

($d\vec{\ell} = r\, d\theta\, \hat{\theta}$)

$\vec{A}\cdot(\vec{B}\times\vec{C}) = \vec{B}\cdot(\vec{C}\times\vec{A}) = \vec{C}\cdot(\vec{A}\times\vec{B})$

$$(\hat{\phi}\times\hat{z})\cdot\hat{\theta} = \hat{\theta}\cdot(\hat{\phi}\times\hat{z}) = \hat{z}\cdot(\hat{\theta}\times\hat{\phi}) = \hat{z}\cdot\hat{r} = \cos\theta$$

($\hat{\theta}$: A, $\hat{\phi}$: B, $\hat{z}$: C; $\hat{\theta}\times\hat{\phi} = \hat{r}$)

$\vec{M} = \chi_m \vec{H}$ $\qquad$ mag dipole moment / vol

find $\vec{M}$ = $\dfrac{\text{atoms}}{\text{vol}} \cdot \dfrac{\text{mag dipole}}{\text{atom}}$

N $\qquad$ $\vec{m}$